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# MILLING, BAKING, AND CHEMICAL EXPERIMENTS WITH HARD RED SPRING WHEAT, 1946 CROP[1/]

by

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## INTRODUCTION

Samples of the standard varieties and some of the new hybrid strains of hard red spring wheat, grown in cooperative experiments in the spring-wheat region[2/] of the United States, are milled each year by the United States Department of Agriculture and the flour baked into bread to determine their quality characteristics.

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1/ Cooperative investigations of the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, and the Grain Branch, Production and Marketing Administration. The samples were obtained from the cooperative experiments with the State Agricultural Experiment Stations in the spring wheat region.

2/ Clark, J. A. Results of spring wheat varieties grown in cooperative plot and nursery experiments in the spring-wheat region in 1946, with averages for 1938 to 1946. U. S. Dept. Agr., Agr. Res. Admin., Bur. Plant Indus., Soils and Agr. Engin., Div. Cereal Crops and Dis. 74 CC, 57 pp. March 1947 (processed.)

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The baking methods and techniques used on the 1946 crop were essentiall the same as used in testing the wheat varieties and hybrid strains from the 1944 and 1945 crops. The bread-baking tests for the 1944, 1945, and 1946 samples were made by a rich highly bromated formula. One of the regular baking methods (including .001 percent or 1 milligram of bromate per 100 grams of flour) used for the 1939, 1940, 1941, 1942, and 1943 samples (identified as the No. 6 baking test in the reports for these years) was continued for the 1944, 1945, and 1946 experiments. As in past seasons, the Minnesota and North Dakota baking methods also were used on the seven uniform varieties of both the Eastern and Western section composites from the region.

In addition, commercial wheat samples from cars grading No. 3 or better were obtained from terminal markets by the Grain Branch, Production and Marketing Administration, for comparison with varietal samples grown in plot and nursery experiments at agricultural experiment stations.

The purpose of this report is to make available to cooperators the quality data from the 1946 crop obtained from standard varieties, new hybrid strains, and Federal supervision grade samples of hard red spring wheat, together with a summary of previous years' results.

## SOURCE OF SAMPLES

The most extensive tests (7) were made on the Eastern and Western composite samples of each of seven uniform varieties grown in plots at cooperating stations. The regular bread-baking tests were made on the varietal samples from plots grown at Madison, Wis.; St. Paul, Waseca, Morris, and Crookston, Minn.; Fargo, Langdon, Edgeley, Williston, Minot, and Dickinson, N. Dak.; Brookings and Newell, S. Dak.; Havre and Moccasin, Mont.; Sheridan, Wyo.; and Akron, Colo. Similar tests were made on samples of new wheats grown in single increase plots (Arizona increases) grown at Fargo and Dickinson. Similar tests were also made on Eastern and Western composites of the 26 strains grown in Uniform Regional Nurseries; composite samples from N. Dak., and Montana Intrastate Nurseries; and from Brookings, S. Dak.; Langdon and Dickinson, N. Dak., station nurseries.

There were also included 18 samples composited from sampling of carlot receipts of wheat accumulated during a 90-day period of the 1946 crop movement by the Minneapolis, Duluth, and Great Falls offices of the Grain Branch, Production and Marketing Administration. These samples represent country-run wheat of the hard red spring class and were graded under the provisions of the U. S. Grain Standards Act as No. 3 or better. These samples are hereafter referred to as commercial samples. This is the eighth season that such samples have been collected and tested.

## METHODS USED IN THE MILLING AND BAKING TESTS

After the removal of dockage the samples were prepared for milling by the use of a milling separator and a scourer (both machines of experimental or laboratory size.) The wheats were tempered in two stages; first to 14 percent for 48 hours and then additional amounts of water added 1/2 hour previous to milling, raising the moisture content of the grain to between 15.0 and 16.5 percent depending upon the hardness of the variety. The wheat was milled on an Allis-Chalmers experimental flour mill provided with three break rolls and one smooth roll. A 90 percent patent flour was made, discarding the low grade.

The hardness of the grain was determined by pearling 20 grams of dockage-free whole wheat for one minute in a model No. 38 Strong-Scott Pearler. The amount of material pearled off expressed as a percentage of the wheat is called the pearling index. This pearling index has been found useful not only as a guide in tempering the samples for milling but also as a measure of the vitreous character of the grain. A low index indicates hard grain and a high index soft grain.

The bread baking tests on the 1946 samples (same as used on the 1944 and 1945 samples) was made by a rich highly bromated formula.

Details of the methods used in 1946, with the various ingredients are shown in Table 1.

Table 1.--Baking methods used for samples of the 1946 crop

| Ingredients | Baking method: Commercial-bromate-malted wheat flour |
|---|---|
| Flour (grams) | 100.0 |
| Yeast (grams) | 2.0 |
| Salt (grams) | 1.5 |
| Sugar (grams) | 5.0 |
| Potassium bromate (grams) 1/ | .0 to .004 |
| Malted wheat flour (grams) | .25 |
| Nonfat dry milk solids (grams) | 4.0 |
| Shortening (grams) | 3.0 |
| Water absorption (percent) | Optimum |
| Mixing time (minutes) | Optimum for each variety |
| Fermentation time (minutes) | 180 |

1/ 0, 1, 2, 3, and 4 mg.

Fermentation periods:

1st. punch after 105 minutes.
2nd. punch after additional 50 minutes.
Mold after additional 25 minutes
Proofing time - 55 minutes
Baked 25 minutes at 450° F.

This baking procedure is based on the method of the American Association of Cereal Chemists, with certain modifications deemed necessary for unbleached experimentally milled flour. Because of the size of the mixing bowl, ingredients sufficient for two loaves were mixed at one time. They were mixed a sufficient length of time to develop the dough properly in a Hobart-Swanson dough-mixer (108 R. P. M.) with 4 pins in the head and 2 pins in the bowl. The absorption of the flour was calculated from the amount of water added for proper consistency at the time the doughs were mixed. The absorption values are indicated in the tables. When mixed, the doughs were divided, then rounded in the hands and placed in fermentation granite-ware "oatmeal" bowls, measuring 6 inches top diameter, 3 inches bottom diameter, and 2-1/2 inches deep. The punches were made by folding the dough approximately 10 times in the hands. At the end of the fermentation period the dough was molded by a Thompson mechanical roll type "A" moulder

with rolls set at a clearance of 3/8 of an inch and the compression plate 1-1/8 inches. The molded doughs were placed in baking pans constructed from 2XX tin known as the tall form. The proofing time of 55 minutes, at 86° F. and baking time of 25 minutes at 450° F. were the same for all samples. Two loaves of each sample were baked but since the ingredients were mixed as for one loaf, the two are not duplicates in the sense in which that term is usually used and are not so considered herein. Data given in the tables are averages of the two loaves.

Most of the baking trials were made on the 1946 samples by varying the amounts of bromate (0 to 4 mg per 100 grams of flour) with the formula given in table 1. With this baking procedure the optimum or maximum loaf volume is apparently obtained with the flour from each variety or strain. It has generally been found that the loaf having the optimum volume also has the best crumb color and grain-texture of the different baking tests made. This test appears to bring out the full strength of the wheats somewhat better than the methods previously used. In actual practice a baking test with 1 milligram and another test with 2 milligrams of bromate is made on the same day. Bakes with no bromate or increased amounts of bromate (.003 grams or higher) are made on the following days until the optimum loaf volume has been determined for each variety or strain. Average volumes are calculated from the three best bakes, only. This baking procedure brings each of the samples to its optimum volume by making provision for adequate gas production, by the employment of sufficient sugar and diastatic supplements, and sufficient oxidation by the use of increasing amounts of potassium bromate. This is the baking method used in the 1946 experiments.

A check or standard flour for control purposes was included in the baking trials with each day's tests. The loaf volume for each of the 69 bakes with the standard flour (12.3 percent protein) and the date of the baking test are shown in the following tabulation:

| Date | Volume Cc. | Date | Volume Cc. | Date | Volume Cc. | Date | Volume Cc. |
|---|---|---|---|---|---|---|---|
| Dec. 2 | 726 | Jan. 16 | 752 | Mar. 19 | 709 | May 1 | 749 |
| 3 | 692 | 21 | 712 | 20 | 729 | 6 | 766 |
| 4 | 735 | 22 | 732 | 26 | 766 | 7 | 781 |
| 5 | 715 | 23 | 747 | 27 | 738 | 8 | 749 |
| 9 | 775 | 27 | 744 | 31 | 744 | 13 | 761 |
| 10 | 723 | 28 | 744 | Apr. 1 | 720 | 14 | 787 |
| 11 | 752 | 29 | 726 | 3 | 743 | 15 | 747 |
| 16 | 715 | 30 | 775 | 7 | 764 | 19 | 795 |
| 18 | 750 | Feb. 3 | 769 | 14 | 707 | 20 | 781 |
| 19 | 741 | 5 | 755 | 16 | 747 | 21 | 781 |
| 30 | 738 | 6 | 741 | 17 | 758 | 22 | 784 |
| Jan. 2 | 732 | 10 | 732 | 21 | 755 | 26 | 792 |
| 6 | 704 | 17 | 729 | 22 | 741 | 27 | 783 |
| 7 | 744 | 20 | 732 | 23 | 769 | 28 | 789 |
| 9 | 752 | 24 | 732 | 24 | 766 | June 3 | 758 |
| 13 | 738 | Mar. 6 | 732 | 28 | 735 | | |
| 14 | 752 | 10 | 720 | 29 | 763 | | |
| 15 | 741 | 18 | 707 | 30 | 781 | | |
| | | | | Average | | | 747 |
| | | | | Standard Error | | | 23.7 |

Sixty-nine baking tests were made with the standard flour. The average loaf volume was 747 cc and the standard error 23.7 cc.

## EXPERIMENTAL RESULTS

The results for the regular methods on plot and nursery composite and station samples are given in tables 2 to 7, and for U. S. D. A., North Dakota, and Minnesota methods on the seven uniform varieties in table 8. The results for the commercial samples are shown in table 9, and the correlation and regression coefficients for 14 varieties and strains and the commercial samples are shown in table 10. Summaries of the comparable 1946 samples are averaged in table 11, and 8-year results in table 12. These tables are largely self-explanatory. The highest ranking variety or strain with respect to each property is indicated by underlining.

Acre yields are included, where comparable, to assist in the interpretation of results. High acre yields tend to reduce the protein content and loaf volume. The test weights for most of the composite and station samples were satisfactory. The milling and chemical data in table 2 are not repeated for the other baking methods reported in table 8.

All test weights were determined in the laboratory on a dockage-free basis. The protein and ash contents are reported on a 14.0 percent moisture basis and the flour yield on a moisture-free basis.

Table 2.--Yield, milling, baking, and chemical results on the uniform varieties of spring wheat grown at experiment stations, from Eastern and Western composites of the 1946 crop and averages for 3 years.

| Section and Variety | Acre Yield | Test Weight | Protein | | Flour | | Absorption | Mixing Time | Baking Methods and Loaf Volume | | | | | Averages | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Milligrams of Bromate | | | Average | Optimum | Weight of Loaf | Crumb Color | Grain Texture |
| | | | | | | | | | 0 | 1 | 2 | | | | | |
| | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Grams | Score | Score |
| Eastern Composite[1] | | | | | | | | | | | | | | | | |
| Pilot | 26.7 | 58.1 | 13.8 | 12.8 | 73.6 | .48 | 64 | 2.0 | 940 | 809 | 747 | 832 | 940 | 150 | 82 | 88 |
| Cadet | 26.2 | 57.1 | 14.1 | 13.6 | 73.3 | .51 | 66 | 2.5 | 865 | 931 | 856 | 884 | 931 | 150 | 90 | 88 |
| Regent | 73.3 | 57.5 | 14.6 | 13.9 | 73.2 | .46 | 63 | 2.5 | 830 | 916 | 824 | 857 | 913 | 148 | 88 | 88 |
| Newthatch | 25.4 | 57.1 | 14.7 | 14.3 | 74.6 | .50 | 65 | 2.5 | 905 | 903 | 830 | 879 | 905 | 150 | 83 | 90 |
| Thatcher | 26.4 | 58.6 | 14.1 | 13.5 | 75.0 | .49 | 64 | 2.5 | 892 | 8.5 | 767 | 825 | 892 | 148 | 80 | 85 |
| Mida | 26.2 | 60.6 | 14.0 | 13.2 | 75.7 | .50 | 66 | 2.0 | 871 | 856 | 749 | 825 | 871 | 152 | 92 | 90 |
| Rival | 30.1 | 59.6 | 14.0 | 13.1 | 75.7 | .52 | 65 | 2.0 | 848 | 854 | 752 | 818 | 854 | 151 | 85 | 87 |
| Average | 26.3 | 58.4 | 14.2 | 13.5 | 74.4 | .49 | 65 | 2.3 | 879 | 869 | 789 | 846 | 901 | 150 | 85 | 88 |
| Range | 6.8 | 3.5 | .9 | 1.5 | 2.5 | .06 | 3 | .5 | 110 | 122 | 109 | 66 | 86 | 4 | 12 | 5 |
| Western Composite[2] | | | | | | | | | | | | | | | | |
| Ceres | 22.6 | 60.5 | 15.4 | 14.7 | 74.1 | .52 | 67 | 2.0 | 965 | 885 | 839 | 896 | 965 | 150 | 90 | 88 |
| Pilot | 22.9 | 59.0 | 15.2 | 14.1 | 72.2 | .45 | 64 | 2.0 | 940 | 876 | 792 | 869 | 940 | 148 | 92 | 87 |
| Cadet | 22.8 | 58.8 | 15.1 | 14.5 | 73.8 | .48 | 66 | 2.0 | 919 | 937 | 859 | 905 | 937 | 150 | 93 | 88 |
| Thatcher | 23.5 | 59.5 | 15.4 | 14.8 | 73.7 | .48 | 64 | 2.0 | 907 | 894 | 807 | 879 | 937 | 149 | 85 | 88 |
| Newthatch | 21.2 | 58.6 | 16.2 | 15.8 | 74.2 | .50 | 65 | 2.0 | 928 | 903 | 856 | 906 | 935 | 148 | 83 | 87 |
| Marquis | 20.4 | 60:6 | 15.0 | 14.0 | 72.2 | .46 | 64 | 2.0 | 905 | 870 | 766 | 847 | 905 | 149 | 88 | 90 |
| Mida | 23.1 | 60.9 | 15.4 | 14.3 | 75.8 | .43 | 64 | 2.0 | 885 | 839 | 792 | 839 | 885 | 150 | 92 | 88 |
| Average | 22.4 | 59.7 | 15.4 | 14.6 | 73.7 | .47 | 65 | 2.0 | 926 | 891 | 816 | 877 | 929 | 149 | 89 | 88 |
| Range | 3.1 | 2.3 | 1.2 | 1.8 | 3.6 | .09 | 3 | 0.0 | 80 | 98 | 93 | 59 | 80 | 3 | 10 | 3 |
| Average Eastern and Western Composites | | | | | | | | | | | | | | | | |
| Pilot | 24.8 | 58.6 | 14.5 | 13.5 | 72.9 | .47 | 64 | 2.0 | 940 | 842 | 770 | 851 | 940 | 149 | 87 | 88 |
| Cadet | 24.5 | 58.0 | 14.6 | 14.1 | 73.6 | .50 | 66 | 2.3 | 892 | 934 | 858 | 895 | 934 | 150 | 92 | 88 |
| Newthatch | 23.3 | 57.9 | 15.5 | 15.1 | 74.4 | .50 | 65 | 2.3 | 917 | 910 | 843 | 893 | 91 | 149 | 83 | 89 |
| Thatcher | 25.0 | 59.1 | 14.8 | 14.2 | 74.4 | .49 | 64 | 2.3 | 915 | 885 | 787 | 852 | 915 | 149 | 83 | 87 |
| Mida | 24.7 | 60.8 | 14.7 | 13.8 | 75.8 | .47 | 65 | 2.0 | 878 | 848 | 771 | 832 | 878 | 151 | 92 | 89 |
| Average | 24.5 | 58.9 | 14.8 | 14.1 | 74.2 | .49 | 65 | 2.2 | 908 | 879 | 806 | 865 | 917 | 150 | 87 | 88 |
| Range | 1.7 | 2.3 | 1.0 | 1.6 | 2.9 | .03 | 2 | .3 | 62 | 92 | 88 | 63 | 62 | 2 | 9 | 2 |

1/ From the Madison, St. Paul, Waseca, Morris, Crookston, Langdon, Fargo, Edgeley, Brookings, and Lincoln stations.
2/ From the Dickinson, Williston, Havre, Moccasin, Sheridan, North Platte, Alliance, and Akron stations.

Table 2.--Continued

Average 3 years, 1944 to 1946 inclusive

| Section and Variety | Acre Yield | | Test Weight | Protein | | Flour | | Absorption | Mixing Time | Baking Methods | | | Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Region | Composite | | Wheat | Flour | Yield | Ash | | | No. 6 | Aver. | Opt. | Weight of Loaf | Crumb Color | Grain Texture |
| | Bu. | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Grams | Score | Score |
| Eastern Composite | | | | | | | | | | | | | | | |
| Cadet | 24.5 | 26.5 | 57.6 | 13.6 | 13.0 | 73.1 | .50 | 67 | 2.3 | 878 | 874 | 908 | 150 | 92 | 91 |
| Newthateh | 23.8 | 26.0 | 57.1 | 14.2 | 13.6 | 73.9 | .51 | 66 | 2.5 | 890 | 876 | 904 | 149 | 85 | 89 |
| Regent | 23.0 | 24.9 | 57.4 | 13.9 | 13.3 | 72.9 | .49 | 63 | 2.3 | 864 | 852 | 891 | 147 | 83 | 87 |
| Pilot | 25.6 | 27.5 | 58.2 | 13.2 | 12.1 | 72.4 | .46 | 63 | 2.2 | 832 | 826 | 876 | 149 | 88 | 89 |
| Thatcher | 23.4 | 25.4 | 58.0 | 13.5 | 12.8 | 73.7 | .49 | 64 | 2.5 | 832 | 83. | 866 | 147 | 84 | 87 |
| Rival | 27.0 | 29.1 | 58.5 | 13.4 | 12.5 | 75.1 | .52 | 65 | 2.3 | 859 | 836 | 864 | 150 | 88 | 90 |
| Mida | 26.5 | 28.9 | 60.6 | 13.5 | 12.5 | 74.9 | .49 | 64 | 2.0 | 837 | 816 | 842 | 151 | 94 | 90 |
| Average | 24.8 | 26.9 | 58.2 | 13.6 | 12.8 | 73.7 | .49 | 65 | 2.3 | 856 | 845 | 879 | 149 | 88 | 89 |
| Range | 4.0 | 4.2 | 3.5 | 1.0 | 1.5 | 2.5 | .06 | 4 | 0.5 | 58 | 52 | 66 | 4 | 11 | 4 |
| Western Composite | | | | | | | | | | | | | | | |
| Thatcher | 28.6 | 24.0 | 58.0 | 15.0 | 14.3 | 72.6 | .52 | 66 | 2.2 | 940 | 915 | 954 | 151 | 84 | 85 |
| Pilot | 29.6 | 24.6 | 57.7 | 14.6 | 13.7 | 71.3 | .45 | 64 | 2.3 | 924 | 903 | 946 | 149 | 89 | 88 |
| Newthateh | 27.9 | 23.0 | 57.5 | 15.6 | 15.2 | 74.3 | .53 | 65 | 2.2 | 934 | 909 | 939 | 150 | 83 | 86 |
| Cadet | 28.3 | 23.6 | 56.8 | 14.9 | 14.1 | 72.7 | .49 | 68 | 2.3 | 932 | 914 | 933 | 151 | 90 | 88 |
| Ceres | 26.5 | 23.8 | 59.5 | 14.8 | 14.2 | 72.8 | .49 | 66 | 2.0 | 881 | 883 | 924 | 151 | 87 | 87 |
| Marquis | 23.0 | 20.9 | 59.2 | 14.5 | 13.8 | 71.4 | .47 | 64 | 2.2 | 872 | 873 | 920 | 148 | 88 | 88 |
| Mida | 29.3 | 24.5 | 60.4 | 14.5 | 13.7 | 74.5 | .43 | 65 | 2.2 | 862 | 841 | 873 | 150 | 93 | 90 |
| Average | 27.6 | 23.5 | 58.4 | 14.8 | 14.1 | 72.9 | .48 | 65 | 2.2 | 906 | 891 | 928 | 150 | 88 | 87 |
| Range | 6.3 | 3.7 | 3.6 | 1.1 | 1.5 | 3.1 | .10 | 4 | 0.3 | 16 | 74 | 76 | 3 | 10 | 5 |
| Average Eastern and Western Composites | | | | | | | | | | | | | | | |
| Newthateh | 25.9 | 24.5 | 57.3 | 15.0 | 14.5 | 74.1 | .52 | 66 | 2.4 | 912 | 891 | 921 | 150 | 84 | 88 |
| Cadet | 26.4 | 25.0 | 57.6 | 14.3 | 13.7 | 73.0 | .50 | 68 | 2.4 | 905 | 893 | 920 | 151 | 91 | 90 |
| Pilot | 27.6 | 26.1 | 58.0 | 13.9 | 12.9 | 72.1 | .46 | 64 | 2.3 | 878 | 864 | 911 | 149 | 88 | 89 |
| Thatcher | 26.0 | 24.7 | 58.0 | 14.3 | 13.6 | 73.2 | .51 | 65 | 2.4 | 886 | 869 | 907 | 149 | 85 | 87 |
| Mida | 27.9 | 26.7 | 60.5 | 14.0 | 13.1 | 74.7 | .46 | 65 | 2.1 | 850 | 828 | 860 | 151 | 93 | 90 |
| Average | 26.8 | 25.4 | 58.3 | 14.3 | 13.6 | 73.4 | .49 | 66 | 2.3 | 886 | 869 | 904 | 150 | 88 | 89 |
| Range | 2.0 | 2.2 | 3.2 | 1.1 | 1.6 | 2.6 | .06 | 4 | 0.3 | 62 | 65 | 61 | 2 | 9 | 3 |

Table 3.--Yield, milling, baking, and chemical results for the leading hard red spring wheats grown in replicated "plots" in 1946

## Madison, Wis.

| Variety or Cross | C. I. No. | Acre Yield | Test Weight | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume — Milligrams of Bromate | | | | Average | | Weight of loaf | Average | | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | Aver. 3 best | Optimum | | Crumb Color | Grain Texture | Index Value |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Grams | Score | Score | Pct. |
| Henry | 12265 | 33.0 | 61.8 | 12.1 | 11.1 | 75.9 | .54 | 65 | 2.0 | 744 | 784 | 687 | | 738 | 784 | 154 | 75 | 80 | 32.7 |
| Rival | 11708 | 23.2 | 61.5 | 13.0 | 12.2 | 75.2 | .56 | 68 | 2.5 | 764 | 766 | 660 | | 730 | 766 | 155 | 82 | 85 | 30.2 |
| Regent | 12070 | 22.7 | 61.5 | 12.4 | 11.7 | 73.2 | .49 | 65 | 3.0 | 732 | 735 | 723 | | 727 | 735 | 152 | 82 | 85 | 27.1 |
| Cadet | 12053 | 23.9 | 60.9 | 12.1 | 11.4 | 73.1 | .54 | 67 | 2.5 | 729 | 712 | 666 | | 702 | 729 | 155 | 88 | 88 | 24.8 |
| Pilot x Mida | 12303 | 29.2 | 62.5 | 11.5 | 10.6 | 74.9 | .50 | 65 | 2.0 | 657 | 712 | 609 | | 659 | 712 | 155 | 85 | 80 | 27.9 |
| Mida | 12008 | 21.8 | 61.8 | 12.8 | 12.0 | 73.7 | .49 | 66 | 2.5 | 672 | 709 | 663 | | 681 | 709 | 154 | 87 | 85 | 29.6 |
| Newthatch | 12318 | 23.9 | 61.1 | 12.6 | 11.8 | 74.2 | .48 | 64 | 2.5 | 703 | 699 | 677 | | 693 | 703 | 154 | 87 | 83 | 25.0 |
| Thatcher | 10003 | 23.7 | 60.9 | 12.4 | 11.5 | 74.1 | .55 | 64 | 2.5 | 692 | 668 | 650 | | 680 | 692 | 149 | 82 | 78 | 23.2 |
| (H157A-1-5-1-3) | 12425 | 23.9 | 61.1 | 12.3 | 11.0 | 74.4 | .49 | 63 | 3.0 | 692 | 683 | 640 | | 665 | 692 | 150 | 73 | 77 | 29.7 |
| Pilot | 11945 | 27.8 | 61.4 | 11.5 | 10.3 | 72.3 | .39 | 64 | 2.5 | 674 | 634 | 609 | | 639 | 674 | 152 | 85 | 83 | 25.3 |
| Sturgeon | 11703 | 25.6 | 62.4 | 12.6 | 11.3 | 73.1 | .47 | 60 | 2.0 | 669 | 672 | 603 | | 648 | 672 | 151 | 88 | 80 | 33.1 |
| Merit x Pilot | 12315 | 26.2 | 60.8 | 12.1 | 11.2 | 71.4 | .63 | 69 | 3.0 | 666 | 618 | 573 | | 619 | 666 | 156 | 82 | 77 | 22.5 |
| Average | | 25.4 | 61.5 | 12.3 | 11.3 | 73.1 | .51 | 65 | 2.5 | 700 | 698 | 648 | | 682 | 711 | 153 | 83 | 82 | |
| Range | | 11.2 | 1.7 | 1.5 | 1.9 | 10.8 | .24 | 9 | 1.0 | 107 | 166 | 150 | | 119 | 118 | 7 | 15 | 11 | |

## St. Paul, Minn.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Regent | 12070 | 32.5 | 57.0 | 15.8 | 15.2 | 74.1 | .57 | 65 | 2.0 | | 974 | 1030 | 882 | 961 | 1030 | 148 | 77 | 88 | 29.7 |
| Redman | 12496 | 36.4 | 58.3 | 14.9 | 14.4 | 75.4 | .51 | 64 | 2.0 | | 936 | 959 | 821 | 903 | 959 | 150 | 87 | 85 | 31.0 |
| Newthatch | 12318 | 36.2 | 58.0 | 15.5 | 14.8 | 74.2 | .53 | 65 | 2.0 | 909 | 931 | 905 | | 915 | 931 | 148 | 85 | 92 | 25.4 |
| Cadet | 12053 | 37.3 | 59.0 | 13.6 | 12.9 | 73.1 | .52 | 67 | 2.0 | | 868 | 868 | 749 | 828 | 868 | 150 | 92 | 88 | 24.8 |
| Pilot | 11945 | 39.7 | 59.7 | 13.5 | 12.4 | 73.8 | .49 | 65 | 2.0 | 856 | 836 | 795 | | 829 | 856 | 152 | 90 | 88 | 24.9 |
| Thatcher | 10003 | 36.3 | 58.0 | 14.1 | 13.2 | 74.0 | .54 | 65 | 2.5 | 845 | 845 | 803 | | 831 | 845 | 147 | 77 | 85 | 23.0 |
| Rival | 11708 | 43.1 | 60.4 | 13.5 | 12.8 | 78.6 | .60 | 67 | 2.5 | 818 | 842 | 812 | | 824 | 842 | 152 | 77 | 92 | 28.3 |
| Mida | 12008 | 41.6 | 61.7 | 13.9 | 12.9 | 77.5 | .55 | 66 | 2.0 | 809 | 842 | 815 | | 822 | 842 | 152 | 90 | 92 | 28.5 |
| K. W. | 12427 | 44.6 | 60.9 | 14.1 | 13.7 | 76.7 | .54 | 64 | 2.0 | 833 | 810 | 803 | | 815 | 833 | 149 | 85 | 88 | 29.1 |
| Hope x Timstein | 12488 | 53.1 | 61.7 | 14.6 | 13.8 | 74.3 | .49 | 66 | 2.0 | 809 | 830 | 795 | | 811 | 830 | 151 | 95 | 93 | 29.7 |
| Henry | 12265 | 50.2 | 60.0 | 13.4 | 12.4 | 78.0 | .54 | 62 | 1.5 | | 821 | 841 | 769 | 804 | 821 | 151 | 72 | 85 | 30.5 |
| 2744 x 2809 | 12440 | 45.5 | 61.1 | 14.0 | 13.1 | 76.0 | .54 | 68 | 2.0 | 800 | 812 | 789 | | 800 | 813 | 151 | 90 | 90 | 29.3 |
| Mercury x Thatcher | 12357 | 41.7 | 59.2 | 13.3 | 12.4 | 76.2 | .57 | 66 | 2.0 | 792 | 795 | 758 | | 782 | 795 | 151 | 77 | 90 | 23.6 |
| Merit x Pilot | 12315 | 44.7 | 60.3 | 13.1 | 12.2 | 72.4 | .55 | 66 | 2.5 | 778 | 752 | 726 | | 752 | 778 | 154 | 85 | 87 | 20.9 |
| Pilot x Mida | 12303 | 42.8 | 62.5 | 13.8 | 13.0 | 75.7 | .47 | 64 | 2.0 | 764 | 747 | 735 | | 749 | 764 | 152 | 85 | 88 | 23.6 |
| Hope x Timstein | 12487 | 49.3 | 62.0 | 15.0 | 13.8 | 73.5 | .54 | 65 | 2.0 | 681 | 715 | 674 | | 673 | 715 | 152 | 77 | 75 | 27.1 |
| K. W. | 12427 | 44.4 | 60.7 | 15.3 | 14.2 | 74.2 | .56 | 63 | 1.0 | 570 | 539 | 539 | | 549 | 570 | 154 | 57 | 57 | 28.2 |
| Average | | 42.3 | 60.0 | 14.1 | 13.3 | 75.2 | .54 | 65 | 2.0 | | 817 | 802 | | 803 | 829 | 151 | 82 | 86 | |
| Range | | 19.6 | 5.5 | 3.0 | 3.2 | 6.2 | .13 | 6 | 1.5 | | 455 | 491 | | 412 | 460 | 7 | 33 | 36 | |

Table 3.--Continued

Langdon, N. Dak.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling index value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | |
| | | | | | | | | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Regent | 12070 | 29.0 | 61.8 | 15.5 | 14.9 | 74.5 | .37 | .65 | 2.0 | 865 | 948 | 920 | | | 911 | 948 | 149 | 87 | 88 | 29.8 |
| 2744 x 2809 | 12440 | 30.2 | 60.2 | 15.9 | 15.0 | 75.0 | .48 | 66 | 2.0 | 836 | 942 | 903 | | | 894 | 942 | 148 | 88 | 88 | 28.4 |
| Newthatch | 12318 | 29.3 | 60.9 | 15.8 | 15.3 | 75.3 | .44 | .65 | 2.0 | 892 | 930 | 922 | | | 915 | 930 | 150 | 83 | 88 | 28.4 |
| Rival | 11708 | 33.0 | 60.4 | 15.4 | 14.9 | 76.3 | .52 | .68 | 2.5 | 859 | 928 | 877 | | | 888 | 928 | 149 | 87 | 83 | 29.0 |
| Merit x Pilot | 12315 | 30.5 | 60.6 | 14.9 | 14.3 | 73.2 | .46 | .67 | 2.5 | 903 | 898 | 839 | | | 880 | 903 | 151 | 90 | 87 | 23.9 |
| Mida | 12008 | 32.0 | 61.3 | 15.7 | 14.3 | 74.8 | .43 | .67 | 2.5 | | 883 | 899 | 891 | | 891 | 899 | 149 | 88 | 88 | 30.8 |
| Thatcher | 10003 | 29.3 | 61.1 | 15.0 | 14.4 | 75.8 | .42 | .65 | 2.0 | 898 | 888 | 848 | | | 878 | 898 | 148 | 88 | 88 | 28.0 |
| Cadet | 12053 | 32.0 | 60.4 | 14.8 | 14.7 | 74.0 | .42 | .67 | 2.0 | 889 | 881 | 830 | | | 867 | 889 | 150 | 90 | 88 | 26.7 |
| Regent x Pilot | 12317 | 29.5 | 61.8 | 14.3 | 13.4 | 72.6 | .44 | .64 | 2.5 | 888 | 862 | 834 | | | 861 | 888 | 145 | 90 | 88 | 24.8 |
| Pilot x 1514 | 12476 | 33.3 | 62.0 | 14.9 | 13.9 | 73.5 | .43 | .64 | 2.0 | 879 | 870 | 836 | | | 862 | 879 | 149 | 87 | 88 | 27.3 |
| Mida x Cadet | 12363 | 33.5 | 61.2 | 13.9 | 13.3 | 77.2 | .40 | 66 | 2.5 | 758 | 865 | 853 | | | 825 | 865 | 150 | 83 | 87 | 28.5 |
| Pilot 13 | 11945 | 27.8 | 60.4 | 14.4 | 13.4 | 72.5 | .40 | 63 | 2.0 | 862 | 803 | 795 | | | 820 | 862 | 147 | 87 | 87 | 25.9 |
| Premier | 11940 | 29.2 | 61.1 | 14.9 | 14.4 | 76.8 | .50 | 66 | 2.0 | 795 | 845 | 821 | | | 820 | 845 | 150 | 92 | 88 | 27.3 |
| Pilot x Mida | 12303 | 32.2 | 62.7 | 14.0 | 13.3 | 76.0 | .38 | 64 | 2.0 | 809 | 827 | 812 | | | 816 | 827 | 150 | 88 | 90 | 28.9 |
| Average | | 30.8 | 61.1 | 15.0 | 14.3 | 74.8 | .44 | 66 | 2.2 | | 884 | 856 | | | 866 | 893 | 149 | 88 | 88 | |
| Range | | 5.7 | 2.5 | 2.0 | 2.0 | 4.7 | .15 | 5 | .5 | | 139 | 110 | | | 99 | 121 | 6 | 9 | 7 | |

Edgely, S. Dak.

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ceres x H.T.F. | 12263 | 21.6 | 60.2 | 15.1 | 14.3 | 74.1 | .42 | 67 | 2.0 | | 917 | 954 | 965 | 899 | 945 | 965 | 153 | 90 | 88 | 31.4 |
| Rival | 11708 | 23.4 | 60.4 | 14.6 | 13.9 | 77.1 | .41 | 69 | 3.0 | 871 | 937 | 871 | | | 893 | 937 | 153 | 90 | 90 | 26.8 |
| Regent | 12070 | 20.5 | 58.8 | 14.7 | 14.3 | 75.2 | .46 | 64 | 2.5 | | 919 | 931 | 914 | | 921 | 931 | 150 | 85 | 87 | 30.7 |
| 2744 x 2809 | 12440 | 22.5 | 60.7 | 15.5 | 14.7 | 75.7 | .40 | 70 | 2.5 | 905 | 931 | 919 | | | 918 | 931 | 154 | 93 | 90 | 27.9 |
| Newthatch | 12318 | 21.3 | 58.1 | 15.0 | 14.8 | 76.7 | .43 | 64 | 2.0 | | 919 | 928 | 920 | | 922 | 928 | 149 | 83 | 90 | 30.0 |
| Merit x Pilot | 12315 | 23.6 | 58.7 | 14.7 | 14.1 | 72.5 | .46 | 69 | 3.0 | 856 | 914 | 876 | | | 882 | 914 | 153 | 92 | 92 | 22.0 |
| Pilot | 11945 | 23.8 | 58.3 | 14.9 | 14.0 | 73.6 | .42 | 62 | 2.5 | 917 | 870 | 853 | | | 880 | 917 | 145 | 88 | 90 | 24.2 |
| Thatcher | 10003 | 22.3 | 59.1 | 14.9 | 14.2 | 75.2 | .40 | 64 | 2.5 | | 896 | 911 | 856 | | 888 | 911 | 147 | 80 | 85 | 26.0 |
| Cadet | 12053 | 24.1 | 58.4 | 15.1 | 14.4 | 73.7 | .47 | 67 | 2.5 | | 898 | 911 | 853 | | 887 | 911 | 151 | 90 | 90 | 25.6 |
| Redman | 12496 | 22.4 | 58.1 | 14.6 | 14.1 | 75.6 | .45 | 65 | 2.5 | 752 | 905 | 879 | | | 845 | 905 | 151 | 85 | 87 | 29.8 |
| Rival x That. | 12273 | 21.3 | 60.7 | 15.2 | 14.7 | 76.2 | .41 | 66 | 3.5 | 865 | 899 | 871 | | | 878 | 899 | 152 | 90 | 92 | 32.1 |
| Spinkcota | 12481 | 25.4 | 61.5 | 15.6 | 14.9 | 72.7 | .41 | 60 | 2.0 | | 882 | 888 | 889 | | 886 | 889 | 149 | 88 | 88 | 37.6 |
| Henry | 12265 | 23.4 | 60.2 | 13.8 | 13.1 | 76.5 | .37 | 62 | 2.5 | 778 | 865 | 853 | | | 832 | 865 | 148 | 80 | 87 | 32.0 |
| Mida | 12008 | 22.5 | 61.9 | 14.5 | 13.7 | 76.4 | .43 | 67 | 2.5 | 818 | 856 | 798 | | | 824 | 856 | 156 | 93 | 90 | 28.5 |
| Average | | 22.7 | 59.7 | 14.9 | 14.2 | 75.1 | .42 | 65 | 2.5 | | 901 | 889 | | | 886 | 911 | 151 | 88 | 89 | |
| Range | | 4.9 | 3.8 | 1.8 | 1.2 | 4.6 | .10 | 10 | 1.5 | | 81 | 156 | | | 128 | 109 | 11 | 13 | 7 | |

Table 3.--Continued

Minot, N. Dak.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | Milligrams of Bromate | | | | | Aver 3 best | Optimum | | | | Index value |
| | | | | | | | | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Rescue | 12436 | 22.9 | 60.5 | 15.6 | 14.8 | 72.3 | .33 | 66 | 2.5 | 986 | 931 | 898 | | | 938 | 986 | 151 | 80 | 82 | 35.0 |
| 2744 x 2809 | 12440 | 17.8 | 60.4 | 15.5 | 14.9 | 71.9 | .34 | 69 | 2.0 | | 965 | 983 | 910 | | 953 | 983 | 150 | 85 | 83 | 31.0 |
| Cadet | 12053 | 21.1 | 59.8 | 16.3 | 15.7 | 75.2 | .51 | 70 | 2.0 | | 962 | 980 | 908 | | 950 | 980 | 156 | 82 | 87 | 28.5 |
| Vesta | 11712 | 20.2 | 60.4 | 16.5 | 15.7 | 73.9 | .39 | 69 | 2.5 | 919 | 974 | 928 | | | 940 | 974 | 153 | 88 | 88 | 34.9 |
| Regent | 11869 | 20.7 | 60.3 | 16.5 | 15.7 | 72.2 | .37 | 67 | 2.0 | 903 | 960 | 942 | | | 935 | 960 | 154 | 82 | 83 | 32.9 |
| Renown | 11947 | 17.0 | 60.1 | 16.1 | 15.4 | 75.8 | .43 | 67 | 2.5 | 922 | 948 | 908 | | | 926 | 948 | 154 | 78 | 83 | 32.1 |
| Ceres | 6900 | 21.3 | 61.1 | 16.5 | 15.7 | 73.2 | .36 | 70 | 2.0 | | 945 | 945 | 898 | | 929 | 945 | 156 | 83 | 83 | 28.3 |
| Pilot | 11945 | 18.6 | 59.1 | 16.2 | 15.1 | 71.0 | .41 | 65 | 2.0 | 937 | 945 | 859 | | | 914 | 945 | 153 | 77 | 87 | 28.6 |
| Newthatch | 12318 | 21.6 | 59.5 | 17.0 | 16.4 | 74.9 | .48 | 65 | 2.0 | | 934 | 942 | 854 | | 910 | 942 | 150 | 75 | 82 | 29.7 |
| Rival | 11708 | 16.1 | 59.7 | 15.8 | 14.9 | 75.0 | .43 | 69 | 2.0 | 922 | 931 | 859 | | | 904 | 931 | 154 | 85 | 87 | 31.7 |
| Redman | 12496 | 21.2 | 60.0 | 15.7 | 15.1 | 74.5 | .40 | 68 | 2.0 | | 928 | 920 | 859 | | 902 | 928 | 154 | 80 | 80 | 35.4 |
| Henry | 12265 | 19.2 | 60.6 | 15.1 | 14.0 | 74.9 | .36 | 66 | 2.0 | 845 | 922 | 903 | | | 890 | 922 | 150 | 70 | 85 | 38.9 |
| Mida | 12008 | 17.0 | 60.8 | 16.1 | 15.4 | 76.1 | .45 | 68 | 2.0 | 914 | 898 | 862 | | | 891 | 914 | 154 | 83 | 87 | 33.0 |
| Thatcher | 10003 | 20.0 | 60.7 | 16.2 | 15.2 | 74.0 | .41 | 66 | 2.0 | 909 | 882 | 865 | | | 885 | 909 | 152 | 77 | 88 | 30.0 |
| Average | | 19.6 | 60.2 | 16.1 | 15.3 | 73.9 | .41 | 68 | 2.1 | | 938 | 914 | | | 919 | 948 | 153 | 80 | 85 | |
| Range | | 6.8 | 1.1 | 1.9 | 2.4 | 5.1 | .18 | 5 | 0.5 | | 92 | 24 | | | 68 | 77 | 6 | 10 | 8 | |

Williston, N. Dak.

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Regent | 12070 | 20.3 | 61.5 | 16.2 | 15.6 | 75.9 | .39 | 68 | 2.0 | | 962 | 1006 | 1033 | 894 | 1000 | 1033 | 152 | 90 | 88 | 36.4 |
| Vesta | 11712 | 26.0 | 62.2 | 15.6 | 15.2 | 78.8 | .50 | 69 | 2.5 | | 906 | 1018 | 1009 | | 978 | 1018 | 152 | 93 | 90 | 37.1 |
| Rescue | 12435 | 22.6 | 61.7 | 14.8 | 14.3 | 74.1 | .46 | 66 | 2.0 | 911 | 998 | 959 | | | 956 | 998 | 150 | 83 | 90 | 35.2 |
| Rival | 11708 | 23.9 | 61.2 | 15.3 | 14.7 | 76.9 | .52 | 69 | 2.5 | | 962 | 968 | 983 | 902 | 971 | 983 | 152 | 93 | 92 | 32.3 |
| 2744 x 2809 | 12440 | 22.6 | 61.4 | 16.1 | 15.5 | 75.2 | .49 | 67 | 2.0 | | 940 | 980 | 954 | | 958 | 980 | 154 | 92 | 93 | 31.7 |
| Merit x Pilot | 12315 | 24.0 | 61.9 | 16.3 | 15.5 | 72.6 | .50 | 69 | 2.0 | | 959 | 974 | 956 | | 935 | 974 | 153 | 90 | 90 | 24.7 |
| Ceres | 6900 | 23.2 | 62.2 | 16.0 | 15.5 | 74.5 | .49 | 68 | 2.0 | | 962 | 971 | 959 | | 964 | 971 | 150 | 88 | 90 | 29.8 |
| Pilot | 11945 | 23.1 | 61.1 | 15.7 | 14.8 | 73.7 | .47 | 65 | 2.0 | 891 | 951 | 920 | | | 921 | 951 | 149 | 88 | 88 | 29.1 |
| Cadet | 12053 | 23.9 | 60.4 | 15.5 | 14.9 | 75.0 | .53 | 69 | 2.0 | 919 | 945 | 925 | | | 930 | 945 | 151 | 90 | 92 | 29.4 |
| Newthatch | 12318 | 25.1 | 60.8 | 15.7 | 15.4 | 75.4 | .50 | 66 | 1.5 | 865 | 945 | 930 | | | 913 | 945 | 152 | 85 | 88 | 32.5 |
| Thatcher | 10003 | 25.9 | 61.9 | 15.1 | 14.6 | 76.0 | .45 | 66 | 2.0 | | 906 | 933 | 905 | | 915 | 933 | 148 | 85 | 87 | 31.5 |
| Mida | 12008 | 24.4 | 62.1 | 15.7 | 14.9 | 77.1 | .51 | 66 | 2.0 | | 883 | 929 | 903 | | 905 | 929 | 152 | 93 | 90 | 32.8 |
| Average | | 23.7 | 61.5 | 15.7 | 15.1 | 75.4 | .48 | 67 | 2.0 | | 943 | 959 | | | 946 | 972 | 151 | 89 | 90 | |
| Range | | 5.8 | 1.8 | 1.5 | 1.3 | 6.2 | .14 | 4 | 0.5 | | 115 | 98 | | | 95 | 100 | 6 | 10 | 6 | |

Table 3.--Continued

Waseca, Minn.

| Variety or Cross | C. I. No. | Acre Yield | Test Weight | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | | Crumb color | Grain texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | Milligrams of Bromate | | | | | Aver 3 best | Optimum | Wt. of loaf | | | Index value |
| | | | | | | | | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Grams | Score | Score | Pct. |
| Newthatch | 12318 | 18.8 | 56.0 | 15.5 | 15.3 | 73.6 | .57 | 64 | 2.0 | 868 | 992 | 986 | | | 955 | 992 | 152 | 88 | 92 | 25.0 |
| Hope x Timstein | 12488 | 20.7 | 60.1 | 16.1 | 15.7 | 73.4 | .57 | 66 | 2.5 | 914 | 992 | 911 | | | 939 | 992 | 150 | 92 | 92 | 28.8 |
| Regent | 12070 | 17.2 | 55.9 | 14.7 | 14.4 | 70.6 | .55 | 64 | 2.5 | | 910 | 943 | 971 | 951 | 941 | 971 | 148 | 75 | 90 | 27.0 |
| Redman | 12496 | 21.4 | 58.1 | 15.0 | 14.5 | 74.8 | .56 | 64 | 2.0 | | 857 | 940 | 953 | 942 | 917 | 953 | 148 | 92 | 87 | 29.7 |
| Pilot | 11945 | 21.2 | 58.3 | 13.6 | 12.6 | 72.9 | .54 | 62 | 2.0 | 853 | 933 | 854 | | | 880 | 933 | 150 | 88 | 87 | 23.1 |
| Thatcher | 10003 | 20.9 | 58.3 | 14.1 | 13.5 | 73.5 | .54 | 62 | 2.0 | 836 | 925 | 850 | | | 870 | 925 | 149 | 87 | 87 | 24.3 |
| Cadet | 12053 | 21.2 | 57.2 | 14.2 | 13.5 | 72.9 | .57 | 66 | 2.5 | | 863 | 905 | 851 | | 875 | 905 | 150 | 93 | 93 | 23.8 |
| Mida | 12008 | 23.7 | 60.7 | 14.1 | 13.5 | 73.7 | .57 | 64 | 2.0 | 810 | 905 | 885 | | | 860 | 905 | 150 | 92 | 88 | 27.5 |
| Mercury x Thatcher | 12357 | 29.7 | 60.0 | 14.0 | 13.2 | 75.7 | .57 | 67 | 2.5 | 836 | 885 | 830 | | | 851 | 888 | 153 | 92 | 88 | 25.0 |
| 2744 x 2809 | 12440 | 28.2 | 60.6 | 14.6 | 13.8 | 75.9 | .57 | 66 | 2.0 | 827 | 883 | 871 | | | 880 | 883 | 150 | 88 | 93 | 28.3 |
| Rival | 11708 | 28.9 | 60.0 | 14.1 | 13.5 | 76.2 | .59 | 65 | 2.5 | 845 | 880 | 868 | | | 864 | 880 | 149 | 88 | 88 | 26.6 |
| Merit x Pilot | 12315 | 19.1 | 58.7 | 13.1 | 12.3 | 72.5 | .58 | 67 | 2.5 | 801 | 851 | 812 | | | 821 | 851 | 151 | 87 | 87 | 19.7 |
| Henry | 12265 | 27.0 | 59.3 | 12.6 | 11.7 | 76.0 | .50 | 60 | 2.0 | 738 | 810 | 792 | | | 780 | 810 | 148 | 78 | 83 | 32.7 |
| Hope x Timstein | 12486 | 19.5 | 62.2 | 15.6 | 14.8 | 74.1 | .61 | 65 | 2.0 | 640 | 795 | 726 | | | 720 | 795 | 154 | 72 | 73 | 25.4 |
| Pilot x Mida | 12303 | 26.3 | 63.1 | 13.1 | 12.2 | 75.7 | .52 | 62 | 2.0 | 772 | 789 | 772 | | | 778 | 789 | 148 | 95 | 87 | 25.6 |
| Hope x Timstein | 12487 | 23.5 | 60.4 | 15.8 | 14.8 | 73.4 | .53 | 60 | 1.5 | 618 | 709 | 648 | | | 658 | 709 | 154 | 77 | 72 | 25.0 |
| Average | | 23.0 | 59.3 | 14.4 | 13.7 | 74.2 | .56 | 64 | 2.2 | | 874 | 848 | | | 848 | 886 | 150 | 87 | 87 | |
| Range | | 10.9 | 6.3 | 3.5 | 4.0 | 5.6 | .11 | 7 | 1.0 | | 283 | 340 | | | 297 | 283 | 6 | 23 | 21 | |

Morris, Minn.

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Regent | 12070 | 21.5 | 54.0 | 14.8 | 14.5 | 73.6 | .57 | 64 | 3.0 | | 916 | 937 | 913 | | 922 | 957 | 147 | 72 | 87 | 29.1 |
| Cadet | 12053 | 23.1 | 54.0 | 14.7 | 13.9 | 72.9 | .54 | 68 | 2.5 | | 899 | 934 | 934 | | 922 | 934 | 152 | 80 | 88 | 24.0 |
| Pilot | 11945 | 25.7 | 56.5 | 14.3 | 13.3 | 73.3 | .52 | 63 | 2.0 | 824 | 911 | 910 | | | 882 | 911 | 147 | 82 | 90 | 24.7 |
| 2744 x 2809 | 12440 | 38.5 | 59.6 | 14.9 | 14.0 | 77.0 | .51 | 67 | 3.0 | 842 | 905 | 893 | | | 881 | 905 | 149 | 88 | 93 | 30.2 |
| Newthatch | 12318 | 23.5 | 54.8 | 15.4 | 14.6 | 74.2 | .53 | 65 | 2.0 | 845 | 903 | 888 | | | 879 | 903 | 152 | 78 | 92 | 27.8 |
| Hope x Timstein | 12488 | 31.5 | 59.8 | 15.4 | 14.6 | 74.9 | .45 | 66 | 3.5 | 876 | 900 | 876 | | | 884 | 900 | 151 | 92 | 93 | 29.3 |
| Henry | 12265 | 31.4 | 57.8 | 13.0 | 11.9 | 76.0 | .53 | 62 | 2.0 | | 830 | 885 | 853 | 8 | 856 | 885 | 150 | 73 | 87 | 33.9 |
| Redman | 12496 | 25.8 | 55.9 | 14.5 | 13.9 | 75.0 | .51 | 62 | 2.0 | | 815 | 876 | 862 | | 851 | 876 | 148 | 85 | 92 | 30.1 |
| Rival | 11708 | 35.1 | 58.6 | 14.0 | 13.3 | 77.9 | .58 | 67 | 3.0 | | 856 | 874 | 809 | | 846 | 874 | 151 | 75 | 90 | 28.2 |
| Thatcher | 10003 | 24.6 | 56.6 | 14.3 | 13.3 | 73.4 | .50 | 63 | 2.5 | 818 | 871 | 833 | | | 842 | 871 | 149 | 80 | 87 | 24.5 |
| Merit x Pilot | 12315 | 26.7 | 54.7 | 14.5 | 13.5 | 71.6 | .56 | 67 | 3.5 | 812 | 865 | 862 | | | 846 | 865 | 151 | 88 | 90 | 20.3 |
| Mida | 12008 | 25.7 | 60.1 | 14.2 | 13.4 | 76.5 | .52 | 64 | 2.0 | | 850 | 859 | 801 | | 837 | 859 | 150 | 90 | 92 | 28.2 |
| Pilot x Mida | 12303 | 27.7 | 58.5 | 13.6 | 12.7 | 74.1 | .49 | 65 | 2.5 | 795 | 859 | 830 | | | 828 | 859 | 152 | 83 | 95 | 26.6 |
| Mercury x Thatcher | 12357 | 32.9 | 58.1 | 13.9 | 13.1 | 76.7 | .52 | 67 | 2.5 | 836 | 854 | 851 | | | 847 | 854 | 150 | 83 | 92 | 27.1 |
| K. W. | 12427 | 27.2 | 58.4 | 14.1 | 13.5 | 76.8 | .52 | 63 | 2.0 | | 818 | 845 | 784 | | 816 | 845 | 148 | 85 | 88 | 30.5 |
| Hope x Timstein | 12487 | 32.7 | 61.9 | 14.7 | 13.9 | 74.3 | .50 | 66 | 2.0 | | 804 | 809 | 778 | | 797 | 809 | 154 | 75 | 87 | 25.6 |
| Hope x Timstein | 12486 | 27.0 | 59.9 | 15.0 | 14.0 | 74.2 | .48 | 66 | 1.5 | 683 | 766 | 749 | | | 733 | 766 | 158 | 72 | 80 | 27.6 |
| Average | | 28.3 | 57.6 | 14.4 | 13.6 | 74.8 | .52 | 65 | 2.4 | | 860 | 866 | | | 851 | 874 | 151 | 81 | 90 | |
| Range | | 17.0 | 7.9 | 2.4 | 1.9 | 6.3 | .13 | 6 | 2.0 | | 150 | 188 | | | 189 | 171 | 11 | 30 | 15 | |

Table 3.--Continued

Dickinson, N. D.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver 3 best | Optimum | | | | |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | 4 | | | | | | Index value |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Regent x Mida | 12430 | 15.4 | 63.3 | 15.2 | 14.5 | 76.4 | .51 | 65 | 2.0 | 815 | 901 | 892 | | | 869 | 901 | 150 | 92 | 88 | 34.1 |
| Regent | 11869 | 15.4 | 62.0 | 13.9 | 13.5 | 74.4 | .48 | 66 | 2.0 | | 871 | 883 | 845 | | 866 | 883 | 150 | 85 | 87 | 31.6 |
| Rival | 11708 | 19.9 | 62.8 | 13.8 | 13.0 | 78.3 | .55 | 67 | 2.0 | | 836 | 879 | 850 | | 855 | 879 | 150 | 92 | 90 | 32.3 |
| Pilot x Merit | 12493 | 18.2 | 61.8 | 13.8 | 12.8 | 75.0 | .50 | 68 | 2.0 | 865 | 836 | 830 | | | 844 | 865 | 152 | 97 | 93 | 27.1 |
| Thatcher | 10003 | 16.3 | 62.5 | 13.5 | 13.6 | 77.9 | .51 | 66 | 2.0 | 862 | 827 | 807 | | | 832 | 862 | 150 | 85 | 90 | 28.8 |
| Vesta | 11712 | 15.8 | 63.2 | 13.2 | 12.6 | 78.7 | .51 | 68 | 2.5 | 839 | 859 | 845 | | | 848 | 859 | 150 | 92 | 92 | 34.8 |
| 1556 x 1563 | 12431 | 17.6 | 62.3 | 13.1 | 12.3 | 76.1 | .46 | 65 | 2.0 | 848 | 812 | 801 | | | 820 | 848 | 149 | 88 | 92 | 33.3 |
| Merit x Pilot | 12362 | 16.1 | 62.4 | 13.7 | 12.9 | 73.9 | .57 | 69 | 2.0 | 848 | 824 | 744 | | | 805 | 848 | 155 | 88 | 88 | 23.3 |
| Ceres | 6900 | 14.0 | 63.0 | 13.8 | 13.2 | 74.6 | .47 | 67 | 2.0 | 845 | 809 | 767 | | | 807 | 845 | 154 | 80 | 88 | 29.7 |
| Regent x Pilot | 12475 | 17.3 | 63.0 | 12.7 | 11.6 | 72.8 | .48 | 68 | 2.0 | 845 | 747 | 696 | | | 763 | 845 | 151 | 87 | 83 | 25.0 |
| Newthatch | 12318 | 12.7 | 61.3 | 14.6 | 13.4 | 74.8 | .49 | 66 | 2.0 | 844 | 818 | 792 | | | 818 | 844 | 150 | 85 | 88 | 31.3 |
| Regent x Pilot | 12317 | 20.2 | 63.4 | 12.6 | 11.6 | 74.0 | .47 | 66 | 2.0 | 839 | 772 | 723 | | | 778 | 839 | 152 | 80 | 85 | 25.5 |
| 1552 x Mida | 12482 | 20.3 | 62.8 | 12.2 | 11.5 | 77.4 | .50 | 67 | 2.0 | 818 | 836 | 789 | | | 814 | 836 | 151 | 87 | 88 | 32.7 |
| Pilot x 1514 | 12476 | 18.8 | 63.4 | 13.2 | 12.2 | 74.5 | .48 | 66 | 2.0 | 781 | 827 | 760 | | | 789 | 827 | 152 | 78 | 90 | 28.5 |
| Ceres x H.T.F. | 12263 | 15.8 | 62.7 | 13.6 | 12.8 | 75.5 | .48 | 67 | 1.5 | 789 | 830 | 830 | | | 816 | 830 | 152 | 83 | 90 | 32.8 |
| Marquis | 3641 | 15.0 | 63.3 | 12.5 | 11.9 | 74.9 | .47 | 68 | 2.5 | 830 | 755 | 732 | | | 772 | 830 | 153 | 75 | 88 | 28.0 |
| Rescue | 12436 | 19.9 | 63.0 | 12.1 | 11.5 | 74.5 | .46 | 65 | 2.0 | 821 | 769 | 732 | | | 781 | 821 | 153 | 75 | 88 | 30.6 |
| Pilot | 11945 | 15.7 | 62.2 | 13.5 | 12.4 | 74.6 | .44 | 64 | 1.5 | 815 | 784 | 721 | | | 773 | 815 | 151 | 88 | 90 | 27.6 |
| Cadet | 12053 | 17.7 | 62.0 | 13.0 | 12.4 | 74.3 | .49 | 69 | 2.5 | 812 | 789 | 749 | | | 783 | 812 | 152 | 90 | 93 | 26.3 |
| 2744 x 2809 | 12440 | 17.7 | 62.4 | 14.1 | 13.4 | 76.3 | .54 | 68 | 2.0 | 801 | 809 | 803 | | | 804 | 809 | 152 | 83 | 90 | 28.9 |
| Merit x Pilot | 12315 | 16.0 | 61.9 | 13.6 | 12.9 | 73.2 | .53 | 68 | 2.0 | 806 | 761 | 715 | | | 761 | 806 | 152 | 88 | 87 | 23.6 |
| Cadet x Mida | 12363 | 20.8 | 63.1 | 12.4 | 11.7 | 76.8 | .45 | 66 | 2.0 | 806 | 750 | 715 | | | 757 | 806 | 151 | 82 | 90 | 28.3 |
| Mida | 12008 | 18.1 | 64.1 | 13.5 | 12.7 | 77.6 | .47 | 66 | 2.0 | 795 | 767 | 740 | | | 767 | 795 | 153 | 90 | 90 | 30.6 |
| Pilot x Mida | 12303 | 19.3 | 64.0 | 12.9 | 12.1 | 75.8 | .42 | 64 | 2.0 | 767 | 744 | 680 | | | 730 | 767 | 152 | 92 | 88 | 31.3 |
| Merit x Pilot | 12364 | 17.6 | 61.7 | 13.5 | 12.8 | 73.3 | .56 | 66 | 2.0 | 747 | 755 | 707 | | | 736 | 755 | 153 | 83 | 90 | 24.0 |
| Mercury x K.H. | 12483 | 20.7 | 64.2 | 11.9 | 11.0 | 78.0 | .52 | 69 | 2.0 | 704 | 715 | 651 | | | 690 | 715 | 155 | 80 | 80 | 24.3 |
| Average | | 17.4 | 62.8 | 13.3 | 12.6 | 75.5 | .49 | 67 | 2.0 | | 800 | 769 | | | 795 | 829 | 152 | 86 | 89 | |
| Range | | 8.1 | 2.9 | 3.3 | 3.5 | 5.9 | .15 | 5 | 1.0 | | 186 | 241 | | | 139 | 186 | 6 | 22 | 13 | |

Table 3.--Continued.

## Havre, Mont.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling Index Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver 3 best | Optimum | | | | |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Marquis | 3641 | 13.7 | 60.5 | 16.6 | 15.9 | 73.5 | .46 | 66 | 2.0 | 1064 | 1015 | 957 | | | 1012 | 1064 | 150 | 90 | 83 | 32.2 |
| Cadet | 12053 | 14.5 | 57.0 | 15.8 | 15.1 | 73.9 | .54 | 66 | 2.5 | 1015 | 971 | 876 | | | 954 | 1015 | 151 | 87 | 83 | 27.5 |
| Thatcher | 10003 | 16.2 | 57.5 | 16.2 | 15.7 | 74.4 | .47 | 65 | 2.0 | 960 | 963 | 809 | | | 911 | 963 | 144 | 82 | 78 | 30.1 |
| Merit x Pilot | 12315 | 12.7 | 58.1 | 16.1 | 15.4 | 74.4 | .51 | 67 | 2.5 | 959 | 945 | 909 | | | 938 | 959 | 152 | 83 | 83 | 26.7 |
| Newthatch | 12318 | 16.2 | 57.5 | 16.6 | 16.1 | 76.5 | .53 | 65 | 2.0 | 956 | 956 | 906 | | | 939 | 956 | 149 | 87 | 83 | 31.0 |
| Rescue | 12435 | 13.5 | 58.6 | 15.3 | 14.9 | 74.5 | .44 | 63 | 2.5 | 951 | 948 | 897 | | | 932 | 951 | 149 | 87 | 85 | 35.2 |
| Ceres | 6900 | 13.5 | 59.8 | 15.8 | 15.2 | 74.1 | .44 | 63 | 2.5 | 939 | 948 | 848 | | | 912 | 948 | 152 | 83 | 88 | 27.9 |
| Mida x Cadet | 12321 | 15.8 | 58.8 | 14.8 | 14.0 | 76.6 | .46 | 67 | 2.5 | 934 | 905 | 856 | | | 898 | 934 | 152 | 87 | 90 | 27.5 |
| Pilot | 11945 | 16.8 | 57.4 | 16.3 | 15.1 | 72.8 | .45 | 65 | 2.0 | 882 | 934 | 876 | | | 897 | 934 | 149 | 90 | 90 | 28.1 |
| Mida | 12008 | 13.3 | 60.4 | 15.6 | 14.6 | 77.1 | .41 | 64 | 2.0 | 871 | 830 | 789 | | | 830 | 871 | 152 | 90 | 85 | 31.7 |
| Pilot x Mida | 12303 | 15.5 | 60.5 | 14.6 | 13.7 | 75.6 | .40 | 64 | 2.0 | 824 | 871 | 784 | | | 826 | 871 | 150 | 92 | 90 | 31.8 |
| Average | | 14.7 | 58.7 | 15.8 | 15.1 | 74.9 | .46 | 65 | 2.2 | 941 | 935 | 864 | | | 914 | 951 | 150 | 87 | 85 | |
| Range | | 4.1 | 3.5 | 2.5 | 3.4 | 34 | .14 | 5 | 0.5 | 240 | 185 | 173 | | | 182 | 193 | 8 | 10 | 12 | |

## Moccasin, Mont.

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rescue | 12435 | 23.0 | 56.1 | 15.3 | 15.1 | 71.4 | .50 | 62 | 2.0 | 778 | 925 | 801 | | | 835 | 925 | 150 | 73 | 85 | 29.0 |
| Marquis | 3641 | 23.5 | 57.3 | 15.3 | 14.7 | 71.7 | .50 | 63 | 2.0 | 778 | 925 | 795 | | | 833 | 925 | 150 | 83 | 87 | 28.2 |
| Merit x Pilot | 12355 | 24.2 | 56.1 | 15.4 | 14.9 | 71.3 | .58 | 66 | 2.0 | 735 | 920 | 882 | | | 846 | 920 | 150 | 80 | 83 | 21.7 |
| Pilot | 11945 | 28.3 | 56.8 | 15.2 | 14.4 | 71.7 | .43 | 64 | 2.0 | 919 | 866 | 764 | | | 850 | 919 | 151 | 85 | 88 | 26.1 |
| Cadet | 12053 | 24.4 | 56.4 | 15.0 | 14.7 | 72.2 | .51 | 68 | 2.0 | 778 | 908 | 795 | | | 827 | 908 | 153 | 82 | 85 | 26.5 |
| Regent x Pilot | 12417 | 24.0 | 57.7 | 14.6 | 13.8 | 70.1 | .42 | 62 | 2.5 | 906 | 821 | 741 | | | 823 | 906 | 148 | 82 | 87 | 25.2 |
| Mida x Cadet | 12321 | 24.6 | 57.0 | 14.6 | 14.1 | 73.0 | .46 | 65 | 2.5 | 792 | 903 | 792 | | | 829 | 903 | 149 | 82 | 88 | 26.5 |
| Ceres | 6900 | 27.9 | 58.4 | 14.8 | 14.2 | 71.8 | .48 | 66 | 2.5 | 850 | 875 | 781 | | | 835 | 875 | 151 | 77 | 92 | 24.7 |
| Merit x Pilot | 12315 | 25.1 | 57.0 | 15.5 | 14.9 | 69.3 | .53 | 66 | 2.0 | 766 | 874 | 769 | | | 803 | 874 | 152 | 83 | 87 | 21.3 |
| Mida | 12008 | 23.9 | 59.3 | 14.4 | 14.0 | 75.2 | .55 | 64 | 2.0 | 789 | 865 | 769 | | | 808 | 865 | 152 | 83 | 87 | 28.2 |
| Thatcher | 10003 | 28.3 | 58.2 | 15.3 | 14.9 | 73.8 | .50 | 66 | 2.0 | 842 | 859 | 747 | | | 816 | 859 | 150 | 82 | 88 | 28.1 |
| Newthatch | 12328 | 29.2 | 58.0 | 15.5 | 15.3 | 74.5 | .52 | 64 | 2.0 | 806 | 853 | 789 | | | 816 | 853 | 150 | 80 | 88 | 29.3 |
| Pilot x Mida | 12303 | 26.7 | 59.5 | 14.3 | 13.7 | 72.6 | .39 | 64 | 2.0 | 815 | 781 | 697 | | | 764 | 815 | 151 | 80 | 85 | 27.6 |
| Average | | 25.6 | 57.5 | 15.0 | 14.5 | 72.2 | .49 | 65 | 2.1 | 812 | 875 | 779 | | | 822 | 888 | 151 | 81 | 87 | |
| Range | | 6.2 | 3.4 | 1.2 | 1.6 | 5.9 | .16 | 6 | 0.5 | 184 | 144 | 185 | | | 186 | 110 | 5 | 12 | 9 | |

Table 3.--Continued.

Fargo, N. D.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of Loaf | Crumb color | Grain Texture | Pearling Index Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Regent | 12070 | 21.2 | 61.0 | 13.5 | 13.1 | 76.0 | .52 | 66 | 2.5 | 738 | 874 | 856 | | | 823 | 874 | 150 | 77 | 87 | 27.8 |
| Renown | 11947 | 22.5 | 62.0 | 12.6 | 11.9 | 76.8 | .51 | 64 | 2.5 | 732 | 845 | 798 | | | 792 | 845 | 152 | 83 | 88 | 26.4 |
| Ceres x H.T.F. | 12263 | 25.7 | 61.9 | 13.2 | 12.5 | 77.0 | .51 | 68 | 2.0 | | 816 | 830 | 812 | | 819 | 830 | 151 | 88 | 90 | 30.8 |
| Pilot x 1514 | 12476 | 26.0 | 62.2 | 13.0 | 12.0 | 75.9 | .48 | 66 | 2.0 | 830 | 778 | 738 | | | 782 | 830 | 152 | 83 | 90 | 27.6 |
| Rival | 11708 | 28.1 | 61.0 | 13.4 | 12.7 | 77.4 | .52 | 69 | 2.5 | 850 | 827 | 775 | | | 817 | 850 | 152 | 82 | 92 | 27.8 |
| Redman | 12496 | 23.8 | 60.8 | 12.5 | 11.9 | 76.7 | .52 | 67 | 2.5 | 741 | 822 | 812 | | | 792 | 822 | 150 | 88 | 87 | 28.2 |
| Rival x Thatcher | 12273 | 25.9 | 62.6 | 13.8 | 13.3 | 76.9 | .50 | 67 | 2.0 | 783 | 812 | 809 | | | 801 | 812 | 150 | 83 | 93 | 31.0 |
| 2744 x 2809 | 12440 | 24.9 | 61.3 | 13.9 | 12.8 | 75.2 | .49 | 69 | 2.5 | 812 | 789 | 726 | | | 776 | 812 | 152 | 87 | 90 | 29.9 |
| Cadet | 12053 | 24.0 | 59.8 | 12.7 | 12.0 | 74.3 | .47 | 68 | 3.0 | 763 | 806 | 775 | | | 781 | 806 | 152 | 95 | 92 | 23.7 |
| Newthatch | 12318 | 25.2 | 60.0 | 13.3 | 12.9 | 75.9 | .46 | 66 | 2.5 | 789 | 804 | 789 | | | 794 | 804 | 151 | 83 | 90 | 25.6 |
| 1556 x 1563 | 12431 | 27.0 | 60.2 | 12.1 | 11.4 | 75.2 | .44 | 67 | 2.5 | 775 | 801 | 729 | | | 768 | 801 | 153 | 90 | 93 | 29.1 |
| Thatcher | 10003 | 26.5 | 61.0 | 12.7 | 12.0 | 76.0 | .55 | 66 | 2.5 | 786 | 792 | 735 | | | 771 | 792 | 149 | 80 | 88 | 23.7 |
| 2744 x 2809 | 12479 | 27.0 | 61.0 | 13.1 | 12.0 | 75.7 | .49 | 68 | 2.5 | 789 | 744 | 712 | | | 748 | 789 | 152 | 83 | 88 | 28.0 |
| Pilot | 11945 | 26.9 | 61.0 | 12.0 | 10.9 | 73.7 | .43 | 65 | 2.0 | 780 | 677 | 668 | | | 708 | 780 | 152 | 88 | 87 | 25.2 |
| Mida | 12008 | 24.6 | 61.6 | 13.0 | 12.3 | 77.9 | .51 | 68 | 2.5 | 766 | 769 | 727 | | | 754 | 769 | 156 | 90 | 88 | 30.7 |
| Henry | 12265 | 30.0 | 60.7 | 11.6 | 11.0 | 77.6 | .45 | 63 | 2.0 | 758 | 755 | 732 | | | 748 | 758 | 150 | 78 | 85 | 33.4 |
| Marquis | 3641 | 26.2 | 61.9 | 11.8 | 11.1 | 75.3 | .48 | 66 | 2.5 | 720 | 726 | 706 | | | 717 | 726 | 153 | 82 | 87 | 25.8 |
| Pilot x Mida | 12303 | 28.9 | 62.3 | 11.9 | 11.1 | 76.2 | .45 | 63 | 2.0 | 720 | 692 | 666 | | | 693 | 720 | 150 | 82 | 87 | 27.8 |
| Merit x Pilot | 12315 | 27.2 | 61.2 | 11.9 | 11.2 | 74.1 | .51 | 66 | 2.0 | 738 | 643 | 623 | | | 668 | 738 | 153 | 83 | 83 | 23.2 |
| Average | | 25.9 | 61.2 | 12.7 | 12.0 | 76.0 | .49 | 66 | 2.3 | | 777 | 748 | | | 766 | 798 | 152 | 84 | 89 | |
| Range | | 8.8 | 2.8 | 2.3 | 2.4 | 4.2 | .11 | 6 | 1.0 | | 231 | 223 | | | 155 | 154 | 7 | 18 | 10 | |

Table 3.--Continued.

Crookston, Minn.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | Index value |
| | | | | | | | | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Regent | 12070 | 27.9 | 57.6 | 13.9 | 13.3 | 73.1 | .40 | 62 | 2.0 | 801 | 873 | 836 | | | 837 | 873 | 150 | 85 | 92 | 33.8 |
| Rival | 11708 | 32.3 | 59.4 | 14.1 | 13.2 | 75.3 | .40 | 64 | 2.0 | 865 | 839 | 836 | | | 847 | 865 | 150 | 88 | 90 | 31.4 |
| Thatcher | 10003 | 29.5 | 58.3 | 13.8 | 13.1 | 75.6 | .42 | 63 | 2.5 | | 824 | 854 | 758 | | 812 | 854 | 145 | 87 | 88 | 29.3 |
| Hope x Timstein | 12488 | 29.5 | 59.0 | 14.6 | 13.7 | 74.6 | .45 | 66 | 2.0 | | 842 | 853 | 752 | | 816 | 853 | 150 | 93 | 90 | 33.1 |
| 2744 x 2809 | 12440 | 23.8 | 59.2 | 14.3 | 13.2 | 74.8 | .44 | 65 | 2.0 | | 827 | 836 | 783 | | 815 | 836 | 150 | 93 | 90 | 33.6 |
| Cadet | 12053 | 28.3 | 58.1 | 14.2 | 13.5 | 73.0 | .43 | 65 | 2.5 | 827 | 824 | 818 | | | 823 | 827 | 150 | 97 | 95 | 25.7 |
| Henry | 12265 | 32.3 | 59.1 | 12.8 | 11.9 | 74.1 | .41 | 62 | 2.0 | 815 | 821 | 821 | | | 819 | 821 | 149 | 83 | 85 | 40.1 |
| K. W. | 12427 | 23.6 | 59.5 | 13.9 | 13.2 | 75.5 | .44 | 66 | 2.0 | | 809 | 812 | 749 | | 790 | 812 | 152 | 87 | 87 | 33.5 |
| Newthatch | 12318 | 25.4 | 57.2 | 14.1 | 12.9 | 74.9 | .41 | 63 | 2.5 | | 806 | 809 | 772 | | 796 | 809 | 149 | 88 | 88 | 28.8 |
| Hope x Timstein | 12487 | 24.8 | 62.0 | 14.2 | 13.1 | 74.1 | .43 | 65 | 1.5 | | 772 | 801 | 750 | | 774 | 801 | 155 | 92 | 93 | 30.1 |
| Redman | 12496 | 26.3 | 58.1 | 12.7 | 12.2 | 75.5 | .42 | 63 | 2.0 | | 781 | 789 | 766 | | 779 | 789 | 150 | 87 | 87 | 32.1 |
| Pilot | 11945 | 27.5 | 58.2 | 13.2 | 12.1 | 72.2 | .40 | 62 | 2.0 | | 741 | 778 | 752 | | 757 | 778 | 149 | 88 | 83 | 27.5 |
| Mida | 12008 | 29.3 | 60.7 | 13.8 | 12.6 | 76.0 | .38 | 64 | 2.0 | 772 | 729 | 709 | | | 737 | 772 | 154 | 88 | 88 | 33.4 |
| Mercury x Thatcher | 12357 | 30.4 | 58.9 | 13.0 | 12.0 | 76.1 | .40 | 66 | 2.0 | | 714 | 736 | 657 | | 712 | 736 | 153 | 83 | 82 | 31.9 |
| Merit x Pilot | 12315 | 26.5 | 58.4 | 13.3 | 12.4 | 72.4 | .41 | 66 | 2.0 | 760 | 741 | 738 | | | 746 | 760 | 152 | 90 | 88 | 25.3 |
| Pilot x Mida | 12303 | 34.0 | 61.2 | 12.6 | 11.7 | 74.9 | .36 | 62 | 2.0 | | 702 | 732 | 652 | | 695 | 732 | 150 | 90 | 90 | 33.7 |
| Hope x Timstein | 12486 | 23.7 | 60.0 | 15.0 | 13.9 | 75.5 | .50 | 62 | 1.5 | 665 | 709 | 710 | | | 695 | 710 | 152 | 83 | 78 | 30.9 |
| Average | | 27.9 | 59.1 | 13.7 | 12.8 | 74.6 | .42 | 64 | 2.0 | | 786 | 794 | | | 779 | 803 | 151 | 88 | 88 | |
| Range | | 10.4 | 4.8 | 2.4 | 2.2 | 3.9 | .14 | 4 | 1.0 | | 171 | 145 | | | 152 | 163 | 10 | 14 | 17 | |

Table 3.--Continued

Akron, Colo.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | Index value |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Marquis | 3641 | 5.3 | 59.3 | 16.4 | 15.7 | 71.0 | .47 | 66 | 2.0 | 977 | 928 | 778 | | | 894 | 977 | 152 | 88 | 90 | 35.6 |
| Cadet | 12053 | 7.1 | 58.0 | 16.0 | 14.8 | 70.6 | .48 | 67 | 2.0 | 945 | 845 | 780 | | | 857 | 945 | 152 | 92 | 88 | 29.8 |
| Thatcher | 10003 | 7.4 | 56.6 | 16.6 | 15.9 | 72.6 | .52 | 65 | 2.0 | 936 | 839 | 784 | | | 853 | 936 | 149 | 80 | 85 | 32.5 |
| Ceres | 6900 | 7.8 | 59.5 | 16.3 | 15.3 | 71.4 | .50 | 68 | 2.0 | 934 | 827 | 755 | | | 839 | 934 | 153 | 87 | 87 | 31.8 |
| Newthatch | 12328 | 5.4 | 56.0 | 16.7 | 16.0 | 72.8 | .56 | 67 | 2.0 | 931 | 906 | 786 | | | 874 | 931 | 152 | 77 | 87 | 32.7 |
| Reward | 8182 | 7.7 | 57.3 | 17.0 | 16.0 | 68.9 | .51 | 64 | 2.0 | 889 | 925 | 787 | | | 867 | 925 | 147 | 85 | 87 | 31.5 |
| Pilot | 11945 | 8.3 | 58.0 | 15.8 | 14.5 | 70.5 | .48 | 65 | 2.0 | 923 | 798 | 741 | | | 821 | 923 | 151 | 83 | 87 | 29.7 |
| Florence | 6607 | 7.4 | 55.0 | 16.2 | 15.2 | 70.4 | .44 | 62 | 1.5 | 898 | 919 | 876 | | | 898 | 919 | 149 | 95 | 88 | 36.1 |
| Merit x Pilot | 12315 | 7.7 | 56.2 | 16.4 | 15.4 | 69.1 | .61 | 69 | 2.5 | 885 | 917 | 807 | | | 870 | 917 | 153 | 90 | 87 | 28.4 |
| Comet x Pilot | 12073 | 6.9 | 56.8 | 15.8 | 14.6 | 69.8 | .45 | 67 | 2.5 | 911 | 775 | 663 | | | 783 | 911 | 154 | 83 | 85 | 34.0 |
| Converse | 4141 | 6.5 | 57.7 | 16.9 | 15.6 | 69.4 | .55 | 62 | 1.0 | 732 | 859 | 812 | | | 801 | 859 | 148 | 82 | 83 | 44.4 |
| Mida | 12008 | 7.1 | 59.2 | 15.6 | 14.7 | 73.5 | .47 | 66 | 2.0 | 845 | 812 | 706 | | | 788 | 845 | 153 | 88 | 87 | 36.2 |
| Pilot x Mida | 12316 | 7.5 | 60.0 | 15.5 | 14.1 | 72.7 | .47 | 65 | 2.0 | 821 | 678 | 604 | | | 701 | 821 | 153 | 85 | 82 | 34.8 |
| Hope Comet Reliance | 12050 | 7.4 | 58.6 | 15.5 | 14.3 | 74.1 | .44 | 63 | 1.5 | 781 | 781 | 720 | | | 761 | 781 | 150 | 83 | 83 | 37.9 |
| Average | | 7.1 | 57.7 | 15.8 | 15.2 | 71.2 | .50 | 65 | 1.9 | 886 | 844 | 757 | | | 829 | 902 | 151 | 86 | 86 | |
| Range | | 3.0 | 5.0 | 1.5 | 1.9 | 5.2 | .17 | 7 | 1.5 | 245 | 250 | 272 | | | 197 | 196 | 7 | 18 | 8 | |

Table 3.--Continued. Sheridan, Wyo.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling Index value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | |
| | | | | | | | | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Regent x 1582 | 12446 | 45.5 | 58.0 | 15.7 | 14.8 | 71.5 | .50 | 66 | 2.0 | 892 | 962 | 879 | | | 911 | 962 | 152 | 85 | 90 | 29.2 |
| Pilot x Merit | 12442 | 49.2 | 57.6 | 15.8 | 14.9 | 72.2 | .56 | 70 | 2.5 | 916 | 956 | 870 | | | 914 | 956 | 152 | 82 | 87 | 24.5 |
| Rival | 11708 | 41.9 | 57.0 | 15.6 | 14.5 | 75.3 | .44 | 65 | 2.5 | 901 | 954 | 876 | | | 910 | 954 | 149 | 77 | 92 | 28.6 |
| Ceres x H.T.F. | 12263 | 48.3 | 57.5 | 15.4 | 14.3 | 71.2 | .52 | 67 | 2.0 | | 919 | 948 | 936 | | 934 | 948 | 153 | 87 | 90 | 32.1 |
| Ceres | 6900 | 43.1 | 58.0 | 16.6 | 15.5 | 70.9 | .53 | 69 | 2.5 | 917 | 931 | 853 | | | 900 | 931 | 151 | 78 | 88 | 25.2 |
| Regent x Pilot | 12475 | 45.2 | 57.5 | 14.4 | 13.5 | 72.3 | .48 | 67 | 2.5 | 919 | 891 | 812 | | | 874 | 919 | 148 | 80 | 87 | 25.8 |
| Pilot x Mida | 12445 | 51.9 | 61.7 | 14.9 | 13.9 | 73.5 | .43 | 66 | 2.0 | 848 | 914 | 848 | | | 870 | 914 | 150 | 95 | 90 | 31.3 |
| Pilot | 11945 | 43.7 | 57.4 | 13.8 | 12.7 | 72.6 | .43 | 66 | 2.0 | 908 | 905 | 824 | | | 879 | 908 | 151 | 80 | 88 | 24.7 |
| Merit x Pilot | 12362 | 42.5 | 59.4 | 14.6 | 13.8 | 70.4 | .54 | 70 | 2.5 | 896 | 903 | 818 | | | 872 | 903 | 153 | 77 | 90 | 23.6 |
| Marquis | 3641 | 40.9 | 59.7 | 15.3 | 14.2 | 70.7 | .45 | 66 | 2.0 | 876 | 897 | 823 | | | 865 | 897 | 150 | 83 | 87 | 28.4 |
| Mida x Cadet | 12363 | 46.8 | 58.2 | 14.5 | 13.8 | 74.9 | .45 | 67 | 2.0 | 892 | 896 | 848 | | | 879 | 896 | 149 | 83 | 90 | 30.5 |
| Mida | 12008 | 48.3 | 58.4 | 15.4 | 14.3 | 76.6 | .49 | 65 | 2.0 | 854 | 896 | 848 | | | 866 | 896 | 151 | 88 | 92 | 32.2 |
| Pilot x Merit | 12352 | 41.0 | 57.1 | 14.6 | 13.7 | 72.9 | .54 | 68 | 2.5 | 873 | 892 | 854 | | | 873 | 892 | 151 | 85 | 87 | 24.8 |
| Merit x Pilot | 12315 | 51.4 | 57.3 | 15.2 | 14.6 | 70.5 | .55 | 67 | 2.0 | 853 | 885 | 879 | | | 872 | 885 | 150 | 83 | 88 | 24.7 |
| Merit x Pilot | 12355 | 45.5 | 58.1 | 14.2 | 13.5 | 71.4 | .60 | 69 | 2.0 | | 856 | 876 | 859 | | 864 | 876 | 153 | 78 | 88 | 24.1 |
| 2744 x 2809 | 12440 | 48.0 | 56.6 | 15.4 | 14.3 | 73.9 | .52 | 64 | 2.0 | 818 | 876 | 865 | | | 853 | 876 | 148 | 80 | 85 | 30.5 |
| Mida x Cadet | 12441 | 41.9 | 59.6 | 14.7 | 14.0 | 73.3 | .51 | 63 | 1.5 | 764 | 874 | 853 | | | 830 | 874 | 149 | 90 | 88 | 29.0 |
| Mida x Cadet | 12321 | 41.0 | 59.6 | 14.0 | 13.4 | 75.3 | .47 | 68 | 2.0 | 836 | 862 | 842 | | | 847 | 862 | 150 | 82 | 88 | 28.3 |
| Thatcher | 10003 | 47.7 | 59.7 | 14.3 | 13.8 | 73.4 | .44 | 64 | 2.0 | 812 | 859 | 818 | | | 830 | 859 | 147 | 83 | 90 | 29.0 |
| Cadet | 12053 | 48.0 | 56.6 | 13.6 | 12.8 | 73.1 | .47 | 66 | 2.0 | | 812 | 853 | 752 | | 806 | 853 | 152 | 90 | 90 | 27.9 |
| Pilot x 1514 | 12476 | 48.9 | 59.8 | 15.0 | 14.0 | 72.2 | .47 | 64 | 1.5 | | 827 | 827 | 836 | 761 | 830 | 836 | 150 | 80 | 85 | 31.0 |
| Newthatch | 12318 | 39.1 | 57.7 | 16.2 | 15.4 | 72.1 | .53 | 63 | 1.5 | | 784 | 824 | 795 | | 801 | 824 | 149 | 76 | 87 | 31.0 |
| Pilot x Mida | 12316 | 42.2 | 61.2 | 14.6 | 13.5 | 73.3 | .48 | 67 | 2.0 | 809 | 789 | 728 | | | 775 | 809 | 151 | 90 | 83 | 27.7 |
| Pilot x Mida | 12303 | 49.5 | 59.3 | 13.8 | 12.7 | 73.7 | .45 | 63 | 2.0 | 803 | 795 | 714 | | | 771 | 803 | 150 | 92 | 87 | 32.2 |
| Comet | 11465 | 42.5 | 57.7 | 13.5 | 12.6 | 74.1 | .41 | 64 | 2.0 | 798 | 784 | 732 | | | 771 | 798 | 151 | 77 | 87 | 31.2 |
| Comet x Pilot | 12073 | 44.3 | 59.5 | 14.0 | 13.2 | 74.2 | .50 | 65 | 2.0 | 789 | 744 | 680 | | | 738 | 789 | 148 | 62 | 78 | 29.2 |
| Comet x 1018 | 12060 | 40.1 | 55.4 | 13.1 | 12.5 | 74.2 | .47 | 66 | 2.0 | 741 | 755 | 741 | | | 746 | 755 | 152 | 67 | 83 | 29.2 |
| Average | | 45.1 | 58.4 | 14.8 | 13.9 | 73.0 | .49 | 66 | 2.1 | | 867 | 827 | | | 847 | 876 | 150 | 82 | 88 | |
| Range | | 12.8 | 6.3 | 3.5 | 2.9 | 6.2 | .19 | 7 | 1.0 | | 218 | 268 | | | 163 | 207 | 9 | 33 | 14 | |

Table 3.--Continued.

Brookings, S. Dak.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | Milligrams of Bromate | | | | Aver. 3 best | Optimum | | | | Index Value |
| | | | | | | | | | | 0 | 1 | 2 | 3 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Grams | Score | Score | Pct. |
| Cadet | 12053 | 40.4 | 56.1 | 15.2 | 14.7 | 72.5 | .56 | 68 | 2.5 | | 992 | 1041 | 945 | 993 | 1041 | 152 | 93 | 92 | 26.0 |
| Pilot | 11945 | 37.7 | 57.1 | 15.6 | 14.8 | 71.7 | .52 | 65 | 2.0 | | 956 | 1003 | 945 | 968 | 1003 | 150 | 82 | 92 | 26.9 |
| Regent | 12070 | 34.0 | 58.5 | 14.8 | 14.3 | 76.2 | .56 | 66 | 2.0 | | 936 | 995 | 948 | 960 | 995 | 150 | 87 | 90 | 30.1 |
| Newthatch | 12318 | 40.8 | 58.0 | 15.6 | 15.1 | 75.3 | .55 | 67 | 2.0 | | 942 | 980 | 937 | 953 | 980 | 150 | 83 | 93 | 28.6 |
| Ceres | 6900 | 39.4 | 58.9 | 15.3 | 14.6 | 75.8 | .56 | 69 | 2.5 | | 971 | 977 | 968 | 972 | 977 | 153 | 85 | 87 | 26.8 |
| Rival x Thatcher | 12342 | 38.8 | 59.2 | 14.9 | 14.3 | 76.8 | .51 | 66 | 3.0 | | 968 | 965 | 894 | 942 | 968 | 148 | 90 | 92 | 33.7 |
| Rival x Thatcher | 12273 | 39.6 | 60.7 | 14.8 | 14.2 | 78.3 | .52 | 67 | 3.0 | | 945 | 953 | 875 | 924 | 953 | 151 | 90 | 90 | 35.8 |
| Thatcher | 10003 | 28.3 | 58.3 | 14.8 | 14.2 | 73.3 | .50 | 66 | 2.0 | | 925 | 951 | 888 | 921 | 951 | 148 | 82 | 87 | 26.0 |
| Mida | 12008 | 30.2 | 58.9 | 15.2 | 14.4 | 74.9 | .54 | 64 | 2.0 | | 934 | 945 | 898 | 926 | 945 | 150 | 90 | 90 | 28.5 |
| Rival x Thatcher | 12272 | 41.7 | 58.8 | 15.0 | 14.5 | 77.2 | .52 | 66 | 3.0 | | 925 | 940 | 934 | 933 | 940 | 149 | 90 | 90 | 32.2 |
| Rival | 11708 | 44.0 | 59.0 | 14.6 | 13.8 | 76.6 | .51 | 66 | 2.5 | | 900 | 937 | 839 | 909 | 937 | 150 | 88 | 90 | 30.1 |
| Rival x Thatcher | 12299 | 42.3 | 60.4 | 14.9 | 14.2 | 77.0 | .50 | 67 | 3.0 | 865 | 931 | 905 | | 900 | 931 | 148 | 90 | 92 | 31.9 |
| Henry | 12265 | 43.1 | 57.7 | 13.4 | 12.5 | 75.4 | .55 | 62 | 1.5 | | 842 | 923 | 888 | 884 | 923 | 148 | 75 | 92 | 37.6 |
| Merit x Pilot | 12315 | 39.2 | 58.3 | 14.0 | 13.3 | 74.3 | .56 | 68 | 2.5 | | 922 | 917 | 879 | 906 | 922 | 149 | 85 | 92 | 24.4 |
| Pilot x Mida | 12303 | 39.8 | 60.6 | 14.1 | 13.2 | 74.5 | .48 | 62 | 2.0 | | 847 | 879 | 815 | 847 | 879 | 146 | 90 | 93 | 30.0 |
| Average | | 38.6 | 58.7 | 14.8 | 14.1 | 75.3 | .53 | 66 | 2.4 | | 929 | 954 | | 929 | 956 | 149 | 87 | 91 | |
| Range | | 13.8 | 4.6 | 2.2 | 2.6 | 6.6 | 8 | 7 | 1.5 | | 150 | 162 | | 146 | 162 | 7 | 18 | 6 | |

Newell, S. D.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Regent | 12070 | 32.7 | 58.2 | 12.6 | 11.8 | 76.1 | .51 | 60 | 2.0 | 845 | 850 | 789 | | 828 | 850 | 147 | 85 | 88 | 30.5 |
| Pilot | 11945 | 31.7 | 57.1 | 12.3 | 11.4 | 75.0 | .49 | 60 | 2.0 | 845 | 735 | 698 | | 759 | 845 | 149 | 83 | 85 | 26.4 |
| Rival x Thatcher | 12273 | 35.4 | 59.2 | 12.5 | 11.6 | 76.5 | .47 | 60 | 2.0 | 831 | 804 | 749 | | 791 | 821 | 147 | 88 | 88 | 32.6 |
| Newthatch | 12318 | 33.0 | 58.0 | 12.9 | 12.1 | 74.6 | .51 | 62 | 2.0 | 812 | 778 | 677 | | 756 | 812 | 149 | 85 | 85 | 28.4 |
| Cadet | 12053 | 36.0 | 58.6 | 11.8 | 10.9 | 74.0 | .51 | 62 | 2.0 | 812 | 699 | 655 | | 722 | 812 | 149 | 88 | 90 | 26.9 |
| Mida | 12008 | 36.6 | 59.3 | 12.4 | 11.3 | 76.6 | .48 | 62 | 1.5 | 786 | 729 | 657 | | 724 | 786 | 152 | 87 | 85 | 31.5 |
| Thatcher | 10003 | 30.5 | 58.0 | 12.0 | 11.2 | 75.8 | .51 | 62 | 2.5 | 781 | 715 | 698 | | 731 | 781 | 146 | 80 | 87 | 28.3 |
| Ceres | 6900 | 30.5 | 58.0 | 11.6 | 10.5 | 73.5 | .48 | 62 | 2.0 | 761 | 632 | 620 | | 671 | 761 | 150 | 77 | 82 | 27.3 |
| Merit x Pilot | 12315 | 33.8 | 58.3 | 11.6 | 10.5 | 73.3 | .52 | 63 | 1.5 | 760 | 657 | 634 | | 684 | 760 | 151 | 83 | 85 | 24.2 |
| Marquis | 3641 | 22.1 | 56.6 | 11.4 | 10.5 | 71.6 | .50 | 60 | 2.5 | 758 | 655 | 618 | | 677 | 758 | 150 | 82 | 83 | 25.4 |
| R.H. x C.R.H. | 12060 | 38.7 | 59.3 | 11.8 | 10.4 | 75.0 | .46 | 60 | 1.5 | 738 | 657 | 618 | | 671 | 738 | 149 | 80 | 82 | 29.4 |
| Pilot x Mida | 12303 | 38.7 | 60.4 | 11.4 | 10.4 | 75.7 | .44 | 60 | 1.5 | 723 | 637 | 598 | | 653 | 723 | 150 | 85 | 82 | 29.7 |
| Average | | 33.3 | 58.4 | 12.0 | 11.1 | 74.8 | .49 | 61 | 1.9 | 787 | 712 | 668 | | 722 | 787 | 149 | 84 | 85 | |
| Range | | 16.6 | 3.8 | 1.5 | 1.7 | 5.0 | .08 | 3 | 1.0 | 122 | 218 | 169 | | 175 | 127 | 6 | 11 | 8 | |

Table 4.--Yield, milling, baking, and chemical results for newer hard red spring wheats grown in single increase plots at three experiment stations in 1946.

## Dickinson, N. D.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling Index Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| 1533 x Pilot | | 30.1 | 61.8 | 14.3 | 13.2 | 72.6 | .41 | 65 | 2.0 | 928 | 879 | 836 | | | 881 | 928 | 150 | 87 | 83 | 27.2 |
| Pilot x Premier | | 33.4 | 60.9 | 14.7 | 13.9 | 74.4 | .37 | 64 | 2.0 | 925 | 891 | 873 | | | 896 | 925 | 149 | 92 | 93 | 29.6 |
| 1556 x 1563 | | 31.6 | 61.2 | 14.4 | 13.6 | 74.8 | .43 | 65 | 2.0 | 925 | 899 | 839 | | | 888 | 925 | 150 | 83 | 90 | 31.6 |
| Thatcher | 10003 | | 55.1 | 14.9 | 14.3 | 73.1 | .46 | 64 | 2.0 | 908 | 922 | 917 | | | 916 | 922 | 147 | 85 | 85 | 26.4 |
| Regent x Mida | 12542 | | 59.7 | 15.1 | 14.5 | 75.0 | .44 | 63 | 2.5 | | 882 | 922 | 910 | | 905 | 922 | 146 | 93 | 93 | 31.8 |
| 1552 x 12040 | | | 56.1 | 14.2 | 13.3 | 72.3 | .43 | 63 | 2.0 | 913 | 833 | 830 | | | 859 | 913 | 148 | 87 | 92 | 29.5 |
| 1556 x Pilot | | | 56.7 | 14.2 | 13.2 | 71.1 | .42 | 60 | 1.5 | 911 | 886 | 859 | | | 885 | 911 | 149 | 90 | 92 | 27.3 |
| Pilot x Premier | | 35.0 | 61.7 | 13.5 | 12.8 | 75.0 | .39 | 65 | 2.0 | | 870 | 908 | 845 | | 874 | 908 | 149 | 88 | 88 | 31.8 |
| Pilot x Premier | | 32.9 | 61.6 | 14.7 | 13.9 | 76.1 | .42 | 64 | 2.0 | 873 | 892 | 856 | | | 874 | 892 | 152 | 93 | 92 | 30.9 |
| Mida | | 32.9 | 62.6 | 14.4 | 13.7 | 75.9 | .40 | 65 | 2.0 | 871 | 873 | 842 | | | 862 | 873 | 150 | 93 | 87 | 30.5 |
| Regent x Mida | | 31.5 | 61.9 | 13.9 | 13.0 | 72.8 | .39 | 63 | 2.0 | | 853 | 862 | 847 | | 854 | 862 | 149 | 87 | 92 | 30.5 |
| Merc.-2 x K.H. | | 32.0 | 61.5 | 14.2 | 13.4 | 75.7 | .40 | 64 | 2.0 | 809 | 827 | 801 | | | 812 | 827 | 150 | 90 | 85 | 28.9 |
| Ceres[2] x H.T.F. | | 28.8 | 61.8 | 13.0 | 12.4 | 73.5 | .43 | 66 | 2.0 | | 789 | 792 | 778 | | 786 | 792 | 150 | 80 | 92 | 26.4 |
| Average | | | 60.2 | 14.3 | 13.5 | 74.0 | .41 | 64 | 2.0 | | 869 | 857 | | | 869 | 892 | 149 | 88 | 90 | |
| Range | | | 7.5 | 2.1 | 1.7 | 5.0 | .09 | 6 | 1.0 | | 133 | 132 | | | 130 | 136 | 6 | 13 | 10 | |

## Bozeman, Mont.

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thatcher | 10003 | | 59.8 | 13.8 | 12.9 | 74.3 | .44 | 65 | 2.0 | 882 | 824 | 761 | | | 822 | 882 | 150 | 80 | 87 | 31.6 |
| Merit[2] x Thatcher | 12540 | | 61.2 | 12.6 | 11.3 | 72.4 | .36 | 63 | 1.5 | 720 | 717 | 674 | | | 704 | 720 | 152 | 82 | 83 | 27.8 |
| 1691 x 1756 | 12541 | | 60.5 | 12.6 | 11.4 | 72.7 | .48 | 68 | 2.0 | 783 | 738 | 678 | | | 733 | 783 | 155 | 83 | 85 | 36.6 |
| Average | | | 60.5 | 13.0 | 11.9 | 73.1 | .43 | 65 | 1.8 | 795 | 760 | 704 | | | 753 | 795 | 152 | 82 | 85 | |
| Range | | | 1.4 | 1.2 | 1.5 | 1.9 | .12 | 5 | 0.5 | 162 | 107 | 87 | | | 118 | 162 | 5 | 3 | 4 | |

Table 4.--Continued

Fargo, N. Dak.
(Arizona Increases)

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | 4 | | | | | | Index Value |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| 1901 x 1753 | | 14.1 | 56.5 | 14.6 | 13.6 | 72.3 | .41 | 60 | 2.0 | 833 | 905 | 821 | | | 853 | 905 | 147 | 88 | 90 | 34.2 |
| 1520 x 1753 | | 25.0 | 57.1 | 15.2 | 14.2 | 71.5 | .46 | 62 | 1.5 | | 839 | 873 | 839 | | 850 | 873 | 148 | 80 | 85 | 31.1 |
| 1511 x 1248 | | 25.3 | 56.8 | 13.9 | 12.8 | 75.9 | .40 | 60 | 2.0 | | 815 | 862 | 755 | | 811 | 862 | 147 | 85 | 92 | 36.1 |
| 1520 x 1753 | | 30.6 | 59.0 | 13.5 | 12.5 | 71.7 | .38 | 60 | 2.0 | 847 | 818 | 761 | | | 809 | 847 | 146 | 85 | 90 | 32.4 |
| 1750 x 1753 | 12551 | 28.5 | 58.8 | 14.1 | 13.0 | 72.3 | .45 | 62 | 2.0 | 853 | 845 | 787 | | | 828 | 853 | 148 | 88 | 90 | 29.8 |
| 1691 x 1756 | 12541 | 34.1 | 58.0 | 13.7 | 12.6 | 75.2 | .40 | 60 | 1.5 | 804 | 842 | 824 | | | 823 | 842 | 147 | 87 | 90 | 35.9 |
| Merit[2] x Thatcher | 12540 | 27.9 | 58.0 | 13.9 | 12.9 | 72.3 | .46 | 63 | 2.0 | 778 | 836 | 824 | | | 813 | 836 | 148 | 90 | 93 | 24.0 |
| 1750 x Newthatch | | 19.7 | 59.1 | 14.5 | 13.6 | 73.0 | .46 | 58 | 1.5 | 747 | 836 | 815 | | | 799 | 836 | 147 | 87 | 90 | 31.9 |
| 1750 x 1753 | | 30.4 | 57.4 | 13.1 | 12.2 | 73.8 | .45 | 60 | 2.0 | 812 | 830 | 795 | | | 812 | 830 | 147 | 87 | 90 | 31.1 |
| 1750 x 1753 | | 26.1 | 57.8 | 14.9 | 13.9 | 72.3 | .52 | 62 | 2.0 | 761 | 813 | 795 | | | 790 | 813 | 148 | 87 | 88 | 29.4 |
| 1760 x 1750 | | 26.8 | 59.7 | 13.9 | 12.9 | 72.6 | .46 | 60 | 2.0 | 803 | 803 | 752 | | | 786 | 803 | 147 | 90 | 92 | 35.6 |
| 1691 x 1753 | | 22.0 | 56.5 | 13.3 | 12.2 | 72.8 | .43 | 58 | 2.0 | 801 | 680 | 634 | | | 705 | 801 | 148 | 73 | 82 | 33.7 |
| 1764 x 1750 | | 32.9 | 58.7 | 13.4 | 12.5 | 74.6 | .51 | 60 | 2.0 | 749 | 800 | 784 | | | 778 | 800 | 146 | 85 | 87 | 24.1 |
| 1750 x 1753 | 12550 | 24.1 | 58.0 | 13.3 | 12.1 | 74.1 | .43 | 60 | 1.5 | 764 | 786 | 750 | | | 767 | 786 | 148 | 85 | 88 | 29.0 |
| 1750 x 1753 | 12549 | 33.7 | 58.5 | 13.6 | 12.4 | 72.5 | .43 | 60 | 2.0 | 783 | 741 | 683 | | | 736 | 783 | 146 | 82 | 87 | 33.0 |
| Average | | 26.7 | 58.0 | 13.9 | 12.9 | 73.1 | .44 | 60 | 1.9 | | 813 | 784 | | | 797 | 831 | 147 | 85 | 89 | |
| Range | | 20.0 | 3.2 | 2.1 | 2.1 | 4.4 | .14 | 5 | 0.5 | | 225 | 239 | | | 148 | 122 | 2 | 17 | 11 | |

## UNIFORM REGIONAL NURSERY

A number of varieties and selections from hybrids tested during recent years represent some of the newer material of plant breeders. Twenty-six wheats from the Uniform Regional Nursery have been tested in duplicate for their chemical, milling, and baking properties. Grain from eight stations was composited from the Eastern composite and grain from five dry land stations made up the Western composite. The grain from three irrigated stations was not included or tested. The results of the quality tests for the Eastern and Western composites and the average of both composites are shown in table 5. Eleven of the strains have been included in the nursery two years and five of the strains three years.

This discussion of the 1946 results is based on the average of the Eastern and Western composites. The test weight of the samples was very good with a number of the strains averaging above 62 pounds. These were Pilot x Mida 1953, Thatcher x Supreza II-39-27, and Hope x Timstein II-39-44. A number of the wheats also averaged high in wheat protein. Those averaging 15.4 percent or higher were Regent x Mida, Hope x Timstein II-39-42, II-39-44 and II-39-46, 2809 x 2822 Ns. 3129, and 2809-2822 x Premier Ns. 3150. The Hope x Timstein strains as a group averaged uniformly high in protein. The flour yields varied over a wide range. A number of the strains yielded a high percentage of flour, some exceeding others with higher test weights. The better strains in flour yield were Mercury x Thatcher II-36-67, Thatcher x Supreza II-39-27, 2822 x Premier Ns. 3120 and 2809-2822 x Premier Ns. 3150. There was some variation in the milling characteristics among the strains. A number of the wheats were much harder than Thatcher and required extra reductions in the mill for the production of flour. These strains were Pilot x Merit 1898, Regent x Pilot 1953, Hope x Timstein II-39-42, and II-39-44, 2744 x 2809 Ns. 3175, and Merit x Pilot 1969. Hope x Timstein II-39-42 had the hardest grain of the strains compared. It milled with difficulty needing more reductions than any of the other wheats studied.

Most of the other strains were satisfactory in milling quality with a number of the wheats outstandingly good. Those showing excellent milling characteristics were Redman, 2822 x Premier Ns. 3120 and 2809 x 2822 Ns. 3129. The pearling index values were highest for Thatcher x Supreza II-39-27, 2822 x Premier, 2809 x 2822 Ns. 3129 and 2809-2822 x Premier Ns. 3150, suggestive of softer textured grain than that of Thatcher

The flour ash content was generally high with only two wheat averaging in the desired lower range. These were Pilot x Mida 1953 and Pilot x 1514 2014.

There was a wide range in baking quality with marked differences among the wheats in loaf volume. More than half of the samples had loaf volumes higher than 900 cc. Six of the strains having the highest loaf volumes were Regent x Mida 1843, 2822 x Premier Ns. 3120, Mida x Cadet 1752, 1449 x Pilot 2088, Regent x Pilot 1952 and Mida x Cadet 1831. The latter had averaged highest in the 1945 tests. Those with the lowest loaf volumes were the two Hope x Timstein strains II-39-42 and II-39-44 which also averaged lowest in crumb color and grain texture among the wheats compared. Redman, Hope x Timstein II-39-46, and 2744 x 2809 Ns. 3190

averaged highest among the 26 wheats in crumb color and 2822 x Premier Ns. 3120, 2809-2822 x Premier Ns. 3150 and 2744 x 2809 Ns. 3175 were best in grain texture. The water absorption of the flour varied over a range of 6.0 percent. Those highest in water absorption were Pilot x Merit 1898, Thatcher x W-38-Hope, Mercury x Thatcher, 2744 x 2809 Ns. 3190 and Merit x Pilot 1860. Pilot x Merit 1898 had the longest dough mixing time and Thatcher x Supreza and Hope x Timstein II-39-42 the shortest.

The response to oxidizing agents or the tolerance to yeast foods (which are extensively used by the commercial baker) varied among the 26 varieties and strains compared. Thatcher x Supreza II-39-27, Hope x Timstein II-39-42, 2809-2822 x Premier Ns. 3150, and Merit x Pilot 1860 required about twice the amount of bromate as Thatcher for optimum bread. Those samples needing the smallest amounts of oxidizing agents (about half of that required for Thatcher) were Pilot x Mida 1953 and Pilot x 1514 2014 and 2744 x 2809 Ns. 3190.

Mida x Cadet, 1831, has been the highest yielding wheat in the Uniform Regional Nursery for the 2-year period 1945 and 1946. It ranked highest in loaf volume by the optimum bake in 1945 but was sixth in 1946 among the wheats compared. The milling properties were satisfactory and the flour yield good. The ash content of the flour was medium and the water absorption of the flour high. It averaged about the same in crumb color and grain texture of bread as Thatcher.

Thatcher x W38-Hope, Wis. 242, was the second highest yielding wheat in the 1946 Uniform Regional Nursery. Its milling properties were satisfactory. The pearling index value of the grain suggest that it is perhaps slightly softer in texture than some of the varieties with which it was compared. It averaged higher in loaf volume (optimum bake), water absorption of flour, but was apparently the same as Thatcher in crumb color and grain texture. It was one of the lowest in protein content and averaged high in flour ash. Baking tests show that it responds sharply to increasing amounts of bromate indicating that it may have a greater tolerance to fermentation than many other varieties.

Pilot x Mida, 1953, which was the third highest yielding wheat in 1946 was also the best with respect to test weight. It was similar to Thatcher in milling quality. It averaged lower in protein content and flour ash than Thatcher but was equal to Thatcher in water absorption and grain texture of bread. N. 1953 also had good crumbcolor but ranked 22nd in optimum loaf volume among the 26 varieties.

Pilot x 1514, 2014, averaged higher than Thatcher in acre yield and test weight per bushel. It is approximately equal to Thatcher in loaf volume by the optimum bake and grain texture, has a lower flour ash, flour yield and protein content and the same water absorption in the flour. The flour is granular and similar in this respect to Thatcher.

Hope x Timstein, II-39-46, averaged much better in quality than either of the other two Hope x Timstein strains studied. It was also higher in acre yield, ranking sixth and was the highest in protein content of the 26 wheats compared. It ranked 11th in optimum loaf volume in comparison with the other wheats and averaged high in crumb

color and grain texture. It milled satisfactory and the pearling index values suggest that it is somewhat softer textured grain than Thatcher.

2744 x 2809, Ns. 3175, which ranked first for yield in 1945 but 20th in 1946, appears to be similar in most respects to Thatcher. The yield of flour was satisfactory but the grain handles with some difficulty requiring more reductions in the mill than Thatcher. It ranks 10th in optimum loaf volume of the wheats compared, and exceeds Thatcher in crumb color of bread. The dough properties of Ns. 3175 appear to be satisfactory. It required a slightly longer dough mixing time but the same amounts of oxidizing agents as Thatcher for optimum bread.

Table 5.--Yield, milling, baking, and chemical results on 26 wheats grown in the Uniform Regional Nursery for Eastern Composite, Western Composite, and averages of Eastern and Western Composites in 1946.

Eastern Composite [1/]

| Variety or Cross | C.I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | Index value |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Regent x Mida | 12430 | 26.5 | 60.7 | 15.1 | 14.5 | 74.9 | .56 | 64 | 2.0 | | 889 | 939 | 901 | | 910 | 939 | 148 | 87 | 88 | 28.5 |
| 2822 x Premier | 12436 | 27.5 | 60.8 | 14.3 | 13.6 | 77.1 | .49 | 64 | 2.0 | 816 | 931 | 847 | | | 865 | 931 | 149 | 83 | 92 | 30.8 |
| 1449 x Pilot | 12491 | 27.2 | 61.7 | 14.2 | 13.4 | 74.1 | .45 | 63 | 2.0 | 921 | 925 | 896 | | | 914 | 925 | 146 | 85 | 88 | 29.2 |
| Merit x Pilot | 12355 | 29.9 | 60.5 | 13.9 | 13.2 | 72.2 | .55 | 67 | 2.0 | | 873 | 916 | 881 | | 890 | 916 | 150 | 88 | 93 | 21.6 |
| Mida x Cadet | 12321 | 29.5 | 60.4 | 13.8 | 13.3 | 75.1 | .53 | 64 | 2.0 | 806 | 908 | 889 | | | 868 | 908 | 150 | 85 | 90 | 27.6 |
| Rescue | 12435 | 19.3 | 58.1 | 13.8 | 13.3 | 72.3 | .45 | 63 | 2.0 | 813 | 902 | 862 | | | 859 | 902 | 149 | 78 | 90 | 27.4 |
| Redman | 12496 | 26.2 | 59.0 | 14.5 | 14.1 | 74.0 | .48 | 64 | 2.0 | 769 | 899 | 898 | | | 855 | 899 | 150 | 87 | 90 | 28.6 |
| Mida x Cadet | 12363 | 30.4 | 60.1 | 13.9 | 13.4 | 74.7 | .50 | 66 | 2.0 | | 891 | 894 | 885 | | 890 | 894 | 150 | 88 | 90 | 26.6 |
| Regent x Pilot | 12475 | 26.7 | 60.1 | 13.9 | 13.2 | 72.4 | .57 | 64 | 2.0 | | 881 | 889 | 842 | | 871 | 889 | 147 | 82 | 87 | 24.3 |
| 2744 x 2809 | 12440 | 29.3 | 61.1 | 14.7 | 14.1 | 73.6 | .48 | 64 | 2.0 | 830 | 888 | 882 | | | 867 | 888 | 148 | 88 | 95 | 27.3 |
| Hope x Timstein | 12488 | 30.4 | 61.2 | 15.5 | 14.7 | 74.1 | .48 | 64 | 2.0 | 879 | 886 | 850 | | | 872 | 886 | 148 | 92 | 90 | 28.8 |
| 1556 x 1563 | 12431 | 28.8 | 58.9 | 14.0 | 12.9 | 73.4 | .47 | 65 | 2.0 | 809 | 885 | 876 | | | 857 | 885 | 149 | 85 | 92 | 27.2 |
| Pilot x 1514 | 12476 | 30.1 | 61.3 | 14.0 | 12.9 | 72.9 | .45 | 64 | 2.0 | 879 | 848 | 801 | | | 843 | 879 | 147 | 82 | 90 | 25.6 |
| Pilot x Merit | 12490 | 28.9 | 60.4 | 13.6 | 12.8 | 73.7 | .49 | 64 | 2.5 | 781 | 879 | 836 | | | 832 | 879 | 148 | 78 | 90 | 24.0 |
| 2809 - 2822 x Prem. | 12438 | 26.5 | 61.3 | 14.9 | 14.2 | 76.0 | .54 | 64 | 2.0 | | 818 | 839 | 376 | 758 | 844 | 876 | 150 | 82 | 92 | 31.1 |
| Merc. x Thatcher | 12357 | 29.5 | 60.2 | 14.2 | 13.4 | 76.1 | .52 | 68 | 2.5 | 836 | 874 | 804 | | | 838 | 874 | 150 | 87 | 92 | 25.6 |
| 2744 x 2809 | 12489 | 31.7 | 60.5 | 14.5 | 13.9 | 74.5 | .50 | 66 | 2.5 | 845 | 859 | 839 | | | 848 | 859 | 150 | 93 | 92 | 26.9 |
| Thatcher | 10003 | 25.5 | 59.6 | 14.2 | 13.5 | 74.4 | .51 | 63 | 2.0 | 818 | 859 | 836 | | | 838 | 859 | 148 | 82 | 90 | 24.3 |
| That. x W-38-Hope | 12484 | 34.3 | 60.7 | 13.4 | 12.2 | 74.1 | .58 | 66 | 2.5 | 812 | 859 | 818 | | | 830 | 859 | 150 | 83 | 90 | 27.8 |
| Pilot x Merit | 12442 | 30.1 | 60.0 | 13.9 | 13.2 | 72.6 | .49 | 67 | 2.5 | | 842 | 854 | 784 | | 827 | 854 | 148 | 85 | 92 | 21.6 |
| 2809 x 2822 | 12437 | 27.9 | 58.8 | 15.3 | 14.4 | 75.7 | .48 | 63 | 1.5 | 772 | 853 | 833 | | | 819 | 853 | 149 | 82 | 90 | 32.2 |
| Marquis | 3641 | 24.1 | 60.0 | 13.3 | 12.6 | 74.1 | .52 | 64 | 2.0 | 784 | 842 | 815 | | | 814 | 842 | 149 | 87 | 92 | 26.2 |
| Pilot x Mida | 12445 | 31.7 | 62.8 | 13.6 | 12.6 | 74.2 | .45 | 64 | 2.0 | 812 | 839 | 795 | | | 815 | 839 | 146 | 82 | 90 | 25.8 |
| Thatcher x Sarpiza | 12485 | 32.2 | 62.9 | 14.4 | 13.5 | 77.2 | .44 | 63 | 1.5 | | 803 | 821 | 818 | | 814 | 821 | 150 | 88 | 92 | 31.0 |
| Hope x Timstein | 12487 | 30.4 | 62.8 | 15.3 | 14.3 | 72.1 | .53 | 65 | 2.0 | | 723 | 726 | 710 | | 720 | 726 | 154 | 75 | 80 | 26.2 |
| Hope x Timstein | 12486 | 26.5 | 60.8 | 15.6 | 14.6 | 73.2 | .53 | 63 | 1.5 | | 582 | 618 | 609 | | 603 | 618 | 153 | 68 | 70 | 26.1 |
| Average | | 28.5 | 60.6 | 14.3 | 13.5 | 74.2 | .50 | 64 | 2.0 | | 855 | 842 | | | 839 | 865 | 149 | 84 | 90 | |
| Range | | 15.0 | 4.8 | 2.3 | 2.5 | 5.1 | .14 | 5 | 1.0 | | 113 | 321 | | | 311 | 321 | 8 | 25 | 25 | |

1/ From the Madison, St. Paul, Waseca, Morris, Crookston, Langdon, Fargo, and Brookings stations.

Table 5.--Continued

Western Composite 1/

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | Index value |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1. | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Regent x Pilot | 12475 | 20.0 | 58.7 | 15.4 | 14.3 | 70.0 | .47 | 67 | 2.5 | 987 | 950 | 821 | | | 919 | 987 | 154 | 83 | 88 | 25.6 |
| Thatcher x W-38-Hope | 12484 | 21.1 | 57.0 | 15.1 | 14.3 | 72.7 | .43 | 67 | 2.5 | 865 | 986 | 903 | | | 918 | 986 | 152 | 80 | 90 | 30.6 |
| Mida x Cadet | 12321 | 21.6 | 59.2 | 14.7 | 14.2 | 74.2 | .47 | 66 | 2.0 | 922 | 971 | 934 | | | 942 | 971 | 152 | 82 | 88 | 28.3 |
| 2822 x Premier | 12436 | 20.8 | 59.4 | 15.3 | 14.6 | 77.2 | .43 | 65 | 1.5 | 859 | 971 | 893 | | | 908 | 971 | 149 | 85 | 92 | 34.5 |
| Pilot x Merit | 12490 | 21.9 | 59.0 | 15.1 | 14.0 | 73.7 | .47 | 67 | 2.5 | 931 | 968 | 886 | | | 928 | 968 | 153 | 87 | 90 | 27.1 |
| Mida x Cadet | 12363 | 23.1 | 59.1 | 15.0 | 14.2 | 74.0 | .46 | 65 | 2.0 | 900 | 965 | 902 | | | 922 | 965 | 150 | 78 | 88 | 27.9 |
| Regent x Mida | 12430 | 19.7 | 60.5 | 16.0 | 15.5 | 74.9 | .48 | 66 | 2.0 | 876 | 962 | 898 | | | 912 | 962 | 152 | 87 | 87 | 32.4 |
| Pilot x Merit | 12442 | 21.0 | 58.9 | 15.7 | 14.8 | 73.4 | .51 | 69 | 3.0 | 948 | 956 | 879 | | | 928 | 956 | 153 | 85 | 88 | 26.1 |
| 2744 x 2809 | 12440 | 19.8 | 59.3 | 15.5 | 14.5 | 73.5 | .49 | 66 | 2.5 | 905 | 956 | 853 | | | 905 | 956 | 153 | 87 | 88 | 28.2 |
| Hope x Timstein | 12488 | 22.6 | 58.9 | 15.8 | 15.1 | 73.0 | .47 | 66 | 2.0 | 845 | 956 | 885 | | | 895 | 956 | 152 | 92 | 92 | 34.7 |
| 1449 x Pilot | 12491 | 21.1 | 60.2 | 15.2 | 14.2 | 72.3 | .43 | 65 | 2.0 | 916 | 953 | 862 | | | 917 | 953 | 151 | 78 | 88 | 32.4 |
| Merc. x Thatcher | 12357 | 20.4 | 58.8 | 15.3 | 14.6 | 74.9 | .49 | 68 | 2.5 | 859 | 948 | 873 | | | 893 | 948 | 153 | 87 | 87 | 28.4 |
| 2809 - 2822 x Prem. | 12438 | 21.7 | 60.2 | 15.8 | 15.1 | 76.3 | .51 | 66 | 1.5 | 766 | 943 | 882 | | | 864 | 943 | 151 | 88 | 93 | 34.0 |
| Thatcher | 10003 | 22.5 | 59.0 | 15.7 | 15.1 | 73.3 | .47 | 66 | 2.0 | 931 | 939 | 905 | | | 925 | 939 | 151 | 78 | 92 | 31.2 |
| 1556 x 1563 | 12431 | 22.1 | 58.6 | 15.1 | 14.1 | 72.7 | .41 | 67 | 2.0 | 928 | 937 | 901 | | | 922 | 937 | 152 | 80 | 90 | 33.7 |
| Rescue | 12435 | 19.6 | 59.8 | 15.2 | 14.5 | 72.8 | .45 | 63 | 2.0 | 903 | 937 | 908 | | | 916 | 937 | 150 | 80 | 92 | 33.2 |
| 2809 x 2822 | 12437 | 20.1 | 57.5 | 15.6 | 14.7 | 74.5 | .43 | 65 | 1.5 | 783 | 934 | 853 | | | 857 | 934 | 152 | 85 | 88 | 32.5 |
| Merit x Pilot | 12355 | 22.9 | 58.4 | 15.8 | 15.1 | 72.4 | .55 | 67 | 2.0 | | 922 | 931 | 870 | | 908 | 931 | 152 | 85 | 87 | 21.5 |
| Marquis | 3641 | 20.4 | 60.0 | 15.5 | 14.7 | 73.7 | .44 | 65 | 2.0 | 914 | 928 | 898 | | | 913 | 928 | 150 | 88 | 90 | 31.0 |
| Redman | 12496 | 19.4 | 58.0 | 15.2 | 14.6 | 72.9 | .45 | 65 | 2.0 | 850 | 928 | 874 | | | 884 | 928 | 152 | 92 | 90 | 32.1 |
| Pilot x Mida | 12445 | 22.7 | 61.9 | 14.8 | 13.7 | 73.3 | .39 | 66 | 2.0 | 916 | 875 | 824 | | | 872 | 916 | 155 | 92 | 90 | 29.6 |
| Pilot x 1514 | 12476 | 22.3 | 60.1 | 15.2 | 13.9 | 70.5 | .40 | 66 | 2.0 | 898 | 899 | 827 | | | 875 | 899 | 153 | 85 | 88 | 29.0 |
| 2744 x 2809 | 12489 | 20.3 | 59.3 | 14.8 | 14.1 | 73.0 | .47 | 67 | 2.5 | 871 | 851 | 800 | | | 841 | 871 | 153 | 90 | 85 | 29.0 |
| Thatcher x Surpiza | 12485 | 18.3 | 61.2 | 15.9 | 15.0 | 75.6 | .45 | 60 | 1.0 | | 803 | 865 | 824 | | 831 | 865 | 148 | 83 | 88 | 32.4 |
| Hope x Timstein | 12487 | 22.0 | 61.7 | 15.6 | 14.6 | 73.2 | .50 | 66 | 1.5 | 643 | 741 | 668 | | | 684 | 741 | 152 | 72 | 77 | 29.3 |
| Hope x Timstein | 12486 | 18.1 | 59.8 | 15.9 | 15.2 | 73.1 | .49 | 60 | 1.0 | | 618 | 630 | 655 | | 651 | 630 | 150 | 77 | 77 | 32.0 |
| Average | | 21.0 | 59.4 | 15.4 | 14.3 | 73.4 | .46 | 66 | 2.0 | | 915 | 863 | | | 886 | 924 | 152 | 84 | 88 | |
| Range | | 3.7 | 4.9 | 1.3 | 1.8 | 7.2 | .16 | 09 | 1.0 | | 368 | 266 | | | 291 | 307 | 7 | 20 | 15 | |

1/ From the Dickinson, Havre, Moccasin, Alliance and Akron Stations.

Table 5---Continued

Average of Eastern and Western Composite

| Variety or Cross | State or N. No. | Acre Yield | Test Weight | Protein | | Flour | | Absorption | Baking Methods and Loaf Volume | | | Average | | | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | No. 6 | Average | Optimum | Wt. of Loaf | Crumb Color | Grain Texture | Index Value |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Cc. | Cc. | Cc. | Grams | Score | Score | Pct. |
| Regent x Mida | 1843 | 23.1 | 60.6 | 15.6 | 15.0 | 74.9 | .52 | 65 | 926 | 911 | 951 | 150 | 87 | 88 | 30.1 |
| 2822 x Premier | 3120 | 24.2 | 60.1 | 14.8 | 14.1 | 77.2 | .46 | 65 | 951 | 887 | 951 | 149 | 84 | 92 | 32.7 |
| Mida x Cadet | 1752 | 25.6 | 59.8 | 14.3 | 13.8 | 74.7 | .50 | 65 | 940 | 905 | 940 | 151 | 84 | 89 | 28.0 |
| 1449 x Pilot | 2088 | 24.2 | 61.0 | 14.7 | 13.8 | 73.2 | .44 | 64 | 939 | 916 | 939 | 149 | 82 | 88 | 30.8 |
| Regent x Pilot | 1952 | 23.4 | 59.4 | 14.7 | 13.8 | 71.2 | .52 | 66 | 916 | 895 | 938 | 151 | 83 | 88 | 25.0 |
| Mida x Cadet | 1831 | 26.8 | 59.6 | 14.5 | 13.8 | 74.4 | .48 | 66 | 928 | 906 | 930 | 150 | 83 | 89 | 27.3 |
| Pilot x Merit | 1969 | 25.4 | 59.7 | 14.4 | 13.4 | 73.7 | .48 | 66 | 924 | 880 | 924 | 151 | 83 | 90 | 25.3 |
| Merit x Pilot | 1860 | 26.4 | 59.5 | 14.9 | 14.2 | 72.3 | .55 | 67 | 898 | 899 | 923 | 151 | 87 | 90 | 23.1 |
| Thatcher x W-38-Hope-Wis. | Wis. 242 | 27.7 | 58.9 | 14.3 | 13.3 | 73.4 | .51 | 67 | 923 | 874 | 923 | 151 | 82 | 90 | 29.2 |
| 2744 x 2809 | 3175 | 24.5 | 60.2 | 15.1 | 14.3 | 73.6 | .49 | 65 | 922 | 886 | 922 | 151 | 88 | 92 | 27.0 |
| Hope x Timstein | II-39-46 | 26.5 | 60.1 | 15.7 | 14.9 | 73.6 | .48 | 65 | 921 | 884 | 921 | 150 | 92 | 91 | 31.8 |
| Rescue | SC4188 | 19.5 | 59.0 | 14.5 | 13.9 | 72.6 | .45 | 63 | 920 | 888 | 920 | 150 | 79 | 91 | 30.3 |
| Redman | | 22.8 | 58.5 | 14.9 | 14.4 | 73.5 | .47 | 65 | 914 | 870 | 914 | 151 | 90 | 90 | 30.4 |
| 1556 x 1563 | 1840 | 25.5 | 58.8 | 14.5 | 13.5 | 73.1 | .44 | 66 | 911 | 890 | 911 | 151 | 83 | 91 | 30.3 |
| Mercury x Thatcher | II-36-67 | 25.0 | 59.5 | 14.8 | 14.0 | 75.5 | .51 | 68 | 911 | 866 | 911 | 152 | 87 | 90 | 27.0 |
| 2809-2822 x Premier | 3150 | 24.1 | 60.8 | 15.4 | 14.7 | 76.2 | .53 | 65 | 881 | 854 | 910 | 151 | 85 | 93 | 32.3 |
| Pilot x Merit | 1898 | 25.6 | 59.5 | 14.8 | 14.0 | 73.0 | .50 | 68 | 899 | 878 | 905 | 151 | 85 | 90 | 23.4 |
| Thatcher | | 24.0 | 59.3 | 15.0 | 14.3 | 73.9 | .49 | 65 | 899 | 882 | 899 | 150 | 80 | 91 | 27.8 |
| 2809 x 2822 | 3129 | 24.0 | 58.2 | 15.5 | 14.6 | 75.1 | .46 | 64 | 894 | 838 | 894 | 151 | 84 | 89 | 32.4 |
| Pilot x 1514 | 2014 | 26.2 | 60.7 | 14.6 | 13.4 | 71.7 | .43 | 65 | 874 | 859 | 889 | 150 | 84 | 89 | 27.1 |
| Marquis | | 22.3 | 60.0 | 14.4 | 13.7 | 73.4 | .48 | 65 | 885 | 864 | 885 | 150 | 88 | 91 | 28.0 |
| Pilot x Mida | 1953 | 27.2 | 62.3 | 14.2 | 13.2 | 73.8 | .42 | 65 | 857 | 844 | 878 | 151 | 87 | 90 | 27.7 |
| 2744 x 2809 | 3190 | 26.0 | 59.9 | 14.7 | 14.0 | 73.8 | .49 | 67 | 855 | 845 | 865 | 152 | 92 | 89 | 28.0 |
| Thatcher x Supriza | II-39-27 | 25.3 | 62.1 | 15.2 | 14.3 | 76.4 | .45 | 62 | 803 | 823 | 843 | 149 | 82 | 90 | 31.7 |
| Hope x Timstein | II-39-44 | 26.2 | 62.3 | 15.5 | 14.5 | 72.2 | .52 | 66 | 732 | 702 | 734 | 153 | 74 | 79 | 27.8 |
| Hope x Timstein | II-39-42 | 22.3 | 60.3 | 15.8 | 14.9 | 73.2 | .51 | 62 | 600 | 627 | 649 | 152 | 73 | 74 | 29.1 |

Table 6.--Yield, milling, baking and chemical results on hard red spring wheats grown in North Dakota and Montana Intra-State Nurseries composited from stations indicated, 1946 crop.

N. Dak. Interstate Nursery [1/]

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver 3 best | Optimum | | | | Index value |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Regent x 1581 | 12446 | 25.1 | 60.5 | 14.9 | 14.5 | 77.1 | .55 | 67 | 2.0 | 862 | 962 | 943 | | | 922 | 962 | 150 | 78 | 90 | 28.6 |
| Newthatch | | 28.7 | 59.7 | 15.3 | 15.0 | 76.1 | .46 | 66 | 2.5 | 824 | 945 | 900 | | | 890 | 945 | 148 | 77 | 90 | 29.3 |
| Regent x Pilot | | 29.1 | 59.8 | 14.6 | 13.9 | 74.3 | .49 | 67 | 2.0 | 874 | 934 | 911 | | | 906 | 934 | 149 | 85 | 90 | 30.0 |
| 9.21.2.16 | | 27.4 | 61.0 | 15.6 | 14.9 | 75.7 | .50 | 67 | 2.0 | 847 | 919 | 865 | | | 877 | 919 | 151 | 87 | 88 | 28.0 |
| "Elken" | | 27.3 | 61.5 | 15.0 | 14.3 | 76.4 | .48 | 69 | 2.0 | 919 | 855 | 824 | | | 866 | 919 | 153 | 93 | 90 | 29.9 |
| Pilot x Merit | 12493 | 30.0 | 60.8 | 14.9 | 13.9 | 74.7 | .50 | 69 | 2.5 | 897 | 911 | 845 | | | 884 | 911 | 152 | 88 | 88 | 23.3 |
| 1750 x 1753 | 12495 | 26.9 | 61.5 | 15.1 | 13.7 | 73.9 | .47 | 68 | 2.0 | 871 | 908 | 800 | | | 860 | 908 | 153 | 90 | 90 | 25.5 |
| 1552 x Mida | 12482 | 29.2 | 61.7 | 13.7 | 12.7 | 76.1 | .40 | 66 | 2.0 | 821 | 905 | 871 | | | 866 | 905 | 148 | 82 | 87 | 29.6 |
| Merit[2] x Thatcher | 12494 | 28.8 | 60.2 | 14.8 | 14.0 | 73.9 | .52 | 70 | 2.5 | 865 | 901 | 842 | | | 869 | 901 | 152 | 83 | 90 | 22.5 |
| 1 3.32 | | 34.0 | 61.1 | 14.4 | 13.6 | 79.2 | .52 | 70 | 2.5 | 778 | 901 | 865 | | | 848 | 901 | 152 | 77 | 88 | 26.2 |
| Regent x 1315 | | 28.8 | 61.5 | 15.1 | 14.2 | 75.3 | .46 | 66 | 2.0 | 894 | 891 | 815 | | | 867 | 894 | 150 | 87 | 90 | 31.0 |
| 1552 x Mida | | 28.5 | 61.2 | 14.6 | 13.5 | 77.4 | .44 | 66 | 2.0 | 809 | 889 | 862 | | | 853 | 889 | 150 | 90 | 90 | 31.3 |
| Spinkcota | | 33.1 | 62.5 | 16.2 | 15.6 | 74.2 | .51 | 62 | 1.5 | | 819 | 882 | 879 | | 860 | 882 | 150 | 85 | 90 | 36.6 |
| 9.21.9 | 12489 | 29.1 | 60.5 | 15.0 | 14.1 | 76.2 | .53 | 68 | 2.0 | 821 | 881 | 821 | | | 841 | 881 | 152 | 87 | 93 | 26.7 |
| 1615 x Pilot | | 26.9 | 60.0 | 14.7 | 13.6 | 71.9 | .39 | 68 | 2.5 | 879 | 865 | 750 | | | 831 | 879 | 151 | 83 | 85 | 26.1 |
| "Zabeck" | | 28.7 | 61.4 | 14.4 | 13.8 | 78.2 | .55 | 66 | 2.5 | 848 | 876 | 812 | | | 845 | 876 | 151 | 85 | 92 | 28.3 |
| Pilot x Premier | | 28.6 | 61.2 | 14.0 | 13.0 | 75.8 | .43 | 67 | 2.0 | 842 | 876 | 824 | | | 847 | 876 | 151 | 93 | 92 | 27.4 |
| 1750 x 1753 | | 27.0 | 61.8 | 14.8 | 13.7 | 73.0 | .43 | 66 | 2.0 | 836 | 859 | 800 | | | 832 | 859 | 149 | 92 | 90 | 27.2 |
| C.K.H. x Mercury | | 30.3 | 60.8 | 14.1 | 13.2 | 78.6 | .40 | 67 | 2.0 | 769 | 859 | 812 | | | 813 | 859 | 150 | 77 | 87 | 25.0 |
| 1511 x 1248 | | 29.9 | 61.4 | 14.2 | 13.5 | 77.8 | .50 | 65 | 2.0 | 775 | 856 | 824 | | | 818 | 856 | 150 | 78 | 87 | 31.2 |
| 1691 x 1756 | 12492 | 30.4 | 62.1 | 14.3 | 13.5 | 76.2 | .41 | 67 | 2.0 | 853 | 853 | 795 | | | 834 | 853 | 150 | 88 | 93 | 28.2 |
| 9.21.3 | 12479 | 31.2 | 60.4 | 15.0 | 14.2 | 76.8 | .51 | 64 | 2.0 | 789 | 845 | 827 | | | 820 | 845 | 147 | 87 | 90 | 26.8 |
| Merc. x K.H. | 12483 | 32.3 | 62.2 | 14.8 | 13.7 | 76.3 | .46 | 68 | 2.0 | 818 | 842 | 783 | | | 814 | 842 | 151 | 82 | 88 | 24.7 |
| 9.21.1 | | 31.1 | 61.5 | 15.0 | 14.1 | 78.3 | .52 | 68 | 2.0 | 809 | 824 | 772 | | | 802 | 824 | 154 | 88 | 92 | 29.6 |
| 04.5.7 | | 28.0 | 60.4 | 15.4 | 14.7 | 77.1 | .52 | 63 | 2.0 | 729 | 810 | 806 | | | 782 | 810 | 150 | 85 | 90 | 24.9 |
| 04.2.1 | | 29.6 | 61.0 | 15.0 | 14.3 | 77.3 | .49 | 64 | 2.0 | | 789 | 789 | 784 | | 787 | 789 | 147 | 88 | 95 | 24.5 |
| Average | | 29.2 | 61.1 | 14.8 | 14.0 | 76.1 | .48 | 67 | 2.1 | | 876 | 832 | | | 847 | 882 | 150 | 85 | 90 | |
| Range | | 8.9 | 2.8 | 2.5 | 2.9 | 7.3 | .15 | 8 | 1.0 | | 173 | 193 | | | 140 | 173 | 7 | 16 | 10 | |

1/ Fargo, Langdon and Dickinson

Table 6.--Continued

Mont. Intra State Nurseries 1/

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling Index value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | Milligrams of Bromate 0 | 1 | 2 | 3 | 4 | Aver. 3 best | Optimum | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Pilot | 11945 | 21.7 | 56.6 | 15.8 | 15.1 | 70.6 | .45 | 67 | 3.0 | | 945 | 974 | 892 | | 937 | 974 | 148 | 80 | 83 | 27.1 |
| N1564 x Pilot | | 20.0 | 55.5 | 15.5 | 14.6 | 68.9 | .45 | 64 | 2.0 | | 928 | 945 | 871 | | 915 | 945 | 148 | 85 | 87 | 28.5 |
| Regent x N1582 | 12446 | 20.6 | 58.4 | 15.0 | 14.4 | 72.5 | .45 | 66 | 2.5 | 908 | 940 | 931 | | | 926 | 940 | 149 | 83 | 88 | 29.1 |
| Thatcher | 10003 | 22.0 | 57.5 | 16.1 | 15.4 | 70.8 | .46 | 65 | 2.5 | 931 | 939 | 931 | | | 934 | 939 | 150 | 82 | 90 | 28.9 |
| Pilot x Merit | | 23.3 | 58.2 | 15.8 | 14.9 | 73.4 | .40 | 67 | 3.0 | 905 | 928 | 911 | | | 915 | 928 | 150 | 82 | 88 | 27.9 |
| C.H.F. x Renown | | 17.8 | 57.7 | 15.4 | 14.4 | 73.6 | .47 | 66 | 3.5 | 916 | 898 | 850 | | | 888 | 916 | 149 | 78 | 87 | 24.9 |
| Pilot x N1315 | | 21.7 | 58.0 | 15.1 | 14.5 | 72.7 | .40 | 66 | 2.5 | 830 | 911 | 883 | | | 875 | 911 | 153 | 82 | 87 | 31.5 |
| Ceres | 6900 | 19.7 | 58.7 | 15.4 | 14.8 | 71.4 | .43 | 67 | 2.5 | 894 | 908 | 898 | | | 900 | 908 | 152 | 82 | 90 | 26.4 |
| Regent x N1315 | | 21.6 | 58.8 | 16.0 | 15.1 | 73.1 | .36 | 63 | 2.0 | 903 | 893 | 885 | | | 894 | 903 | 148 | 82 | 90 | 32.5 |
| Merit x Pilot | 12493 | 20.0 | 57.3 | 15.9 | 15.1 | 71.6 | .47 | 65 | 2.5 | | 885 | 899 | 859 | | 881 | 899 | 148 | 92 | 87 | 24.4 |
| Regent x N1315 | | 22.6 | 59.1 | 16.1 | 15.0 | 71.1 | .39 | 65 | 2.0 | 897 | 853 | 821 | | | 857 | 897 | 150 | 83 | 87 | 32.0 |
| N1585 x Cadet | | 23.5 | 60.8 | 15.3 | 14.7 | 72.9 | .45 | 66 | 2.5 | 896 | 886 | 853 | | | 878 | 896 | 148 | 77 | 87 | 29.5 |
| Rel. Hope x H44-Ceres | | 18.9 | 58.3 | 15.2 | 14.6 | 71.0 | .50 | 68 | 2.5 | 875 | 892 | 833 | | | 867 | 892 | 153 | 78 | 87 | 25.4 |
| Pilot x Merit | | 22.7 | 58.5 | 15.2 | 14.1 | 71.7 | .44 | 66 | 2.5 | | 836 | 847 | 824 | | 852 | 847 | 150 | 80 | 87 | 27.0 |
| Rel. Hope x Pilot | 12366 | 20.5 | 58.8 | 16.0 | 14.9 | 69.6 | .43 | 65 | 2.5 | 885 | 833 | 807 | | | 842 | 885 | 149 | 80 | 87 | 26.9 |
| Pilot x Merit | | 23.7 | 58.8 | 14.6 | 13.7 | 72.0 | .43 | 64 | 2.5 | | 876 | 882 | 824 | | 861 | 882 | 149 | 87 | 87 | 27.5 |
| Merit x N1614 | | 19.1 | 58.3 | 15.3 | 14.4 | 70.3 | .44 | 67 | 2.0 | 876 | 868 | 836 | | | 860 | 876 | 154 | 78 | 88 | 30.3 |
| Regent x N1315 | | 23.4 | 56.7 | 14.0 | 13.3 | 72.9 | .45 | 63 | 2.0 | | 836 | 856 | 795 | | 829 | 856 | 149 | 80 | 88 | 29.2 |
| N1449 x Pilot | | 21.0 | 58.7 | 15.6 | 14.3 | 69.5 | .48 | 68 | 2.5 | 847 | 854 | 778 | | | 826 | 854 | 153 | 73 | 85 | 23.8 |
| N1590 x Pilot | | 20.2 | 59.1 | 15.1 | 14.5 | 73.5 | .49 | 68 | 2.5 | 795 | 853 | 806 | | | 818 | 853 | 153 | 72 | 85 | 26.1 |
| Pilot x N1315 | | 23.0 | 56.8 | 14.8 | 14.0 | 71.7 | .41 | 64 | 2.0 | 842 | 851 | 830 | | | 841 | 851 | 152 | 87 | 90 | 28.8 |
| Pilot x N1315 | | 21.1 | 57.6 | 14.5 | 13.7 | 70.9 | .39 | 66 | 2.5 | 848 | 845 | 827 | | | 840 | 848 | 152 | 88 | 92 | 29.0 |
| Pilot x N1315 | | 21.7 | 58.1 | 14.4 | 13.6 | 70.5 | .42 | 64 | 2.5 | 818 | 827 | 761 | | | 802 | 827 | 150 | 90 | 90 | 28.5 |
| N1449 x Pilot | | 20.3 | 58.8 | 14.9 | 14.2 | 71.9 | .49 | 63 | 2.0 | 824 | 752 | 738 | | | 771 | 824 | 144 | 85 | 88 | 25.1 |
| Mida x N1315 | | 20.3 | 58.9 | 14.1 | 13.3 | 73.0 | .47 | 65 | 2.0 | 795 | 806 | 775 | | | 792 | 806 | 151 | 83 | 90 | 30.4 |
| Average | | 21.2 | 58.2 | 15.2 | 14.4 | 71.6 | .44 | 66 | 2.4 | | 874 | 854 | | | 864 | 886 | 150 | 82 | 88 | |
| Range | | | 5.3 | 2.1 | 2.1 | 4.7 | .15 | 5 | 1.5 | | 193 | 236 | | | | 168 | 10 | 20 | 9 | |

1/ Moccasin and Havre

Table 7.--Yield, milling, baking, and chemical results on hard red spring wheats grown in the station nurseries at Madison, Wis., and Brookings, S. Dak. in 1946.

Madison, Wis. (Nur.)

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | |
| | | | | | | | | | | 0 | 1 | 2 | 3 | 4 | | | | | | Index value |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Thatcher x W38-Hope | | 24.1 | 58.7 | 13.8 | 12.7 | 74.2 | .52 | 66 | 2.5 | 859 | 762 | 784 | | | 835 | 862 | 152 | 90 | 88 | 28.9 |
| Thatcher x W38-Hope | | 24.0 | 61.1 | 13.6 | 12.7 | 74.0 | .58 | 67 | 3.0 | 803 | 812 | 772 | | | 796 | 812 | 152 | 85 | 88 | 28.3 |
| Thatcher | 10003 | 18.0 | 60.5 | 13.4 | 12.7 | 73.1 | .57 | 65 | 2.5 | 798 | 769 | 752 | | | 780 | 798 | 152 | 73 | 88 | 23.0 |
| Thatcher x W38-Hope | | 23.5 | 61.7 | 13.5 | 12.6 | 73.9 | .50 | 64 | 2.5 | 766 | 798 | 758 | | | 771 | 798 | 150 | 88 | 92 | 26.1 |
| Thatcher x W38-Hope | | 24.4 | 60.7 | 12.9 | 12.0 | 72.5 | .49 | 65 | 3.0 | 723 | 769 | 755 | | | 749 | 769 | 152 | 87 | 88 | 26.8 |
| Thatcher - W38 x Ill.1-Hope | | 27.7 | 61.1 | 12.4 | 11.1 | 74.0 | .49 | 64 | 2.5 | 761 | 732 | 738 | | | 744 | 761 | 151 | 88 | 87 | 27.5 |
| Henry | 12265 | 26.1 | 61.2 | 12.4 | 11.3 | 74.7 | .51 | 63 | 2.0 | 752 | 752 | 721 | | | 742 | 752 | 152 | 78 | 82 | 31.2 |
| Thatcher x W38-Hope | | 27.5 | 61.3 | 12.3 | 11.4 | 73.6 | .48 | 64 | 2.5 | 750 | 732 | 704 | | | 729 | 750 | 150 | 87 | 88 | 25.6 |
| Thatcher x W38-Hope | | 26.2 | 61.1 | 12.0 | 11.1 | 73.3 | .46 | 64 | 2.0 | 738 | 680 | 640 | | | 682 | 738 | 152 | 82 | 85 | 26.6 |
| Thatcher x W38-Hope | | 25.4 | 61.1 | 12.8 | 11.8 | 73.1 | .56 | 65 | 3.5 | 735 | 712 | 674 | | | 706 | 735 | 150 | 80 | 82 | 25.1 |
| Thatcher x W38-Hope | 12484 | 25.6 | 61.3 | 12.1 | 10.8 | 73.4 | .51 | 67 | 3.5 | 726 | 704 | 660 | | | 697 | 726 | 152 | 85 | 85 | 26.8 |
| Average | | 24.8 | 60.1 | 12.8 | 11.8 | 73.6 | .52 | 65 | 2.7 | 765 | 758 | 723 | | | 748 | 773 | 151 | 84 | 87 | |
| Range | | 9.7 | 3.0 | 1.8 | 1.9 | 2.2 | .12 | 4 | 1.5 | 136 | 182 | 144 | | | 153 | 136 | 2 | 17 | 10 | |

Brookings, S. D. (Nur.)

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Regent x 1982 | 12446 | 21.6 | 58.4 | 15.0 | 14.4 | 74.8 | .54 | 64 | 2.0 | | 959 | 1018 | 960 | | 979 | 1018 | 147 | 77 | 87 | 30.2 |
| H.R.R. x Mercury | | 20.9 | 62.3 | 15.9 | 15.1 | 76.5 | .50 | 64 | 1.5 | | 892 | 940 | 928 | | 920 | 940 | 148 | 93 | 92 | 28.5 |
| 1511 x 1249 | | 27.4 | 59.0 | 14.7 | 13.8 | 75.1 | .48 | 64 | 2.5 | | 894 | 937 | 854 | | 895 | 937 | 146 | 73 | 88 | 33.5 |
| 1615 x Pilot | | 26.5 | 59.1 | 14.3 | 13.7 | 73.2 | .58 | 67 | 2.5 | | 885 | 931 | 845 | | 887 | 931 | 149 | 83 | 88 | 27.8 |
| Pilot x Merit | 12493 | 25.9 | 60.4 | 14.5 | 13.7 | 75.1 | .50 | 66 | 2.5 | | 873 | 925 | 879 | | 892 | 925 | 150 | 90 | 88 | 24.5 |
| Triunfo x Thatcher | | 25.9 | 60.7 | 15.6 | 14.5 | 73.8 | .54 | 60 | 1.5 | | 886 | 916 | 873 | | 892 | 916 | 146 | 83 | 88 | 35.2 |
| H.R.R. x Mercury | 12499 | 28.3 | 61.4 | 14.5 | 13.7 | 73.5 | .54 | 64 | 2.5 | | 885 | 914 | 845 | | 881 | 914 | 150 | 78 | 90 | 32.9 |
| Pilot | | 27.6 | 60.5 | 14.5 | 13.7 | 76.3 | .52 | 64 | 2.0 | | 901 | 905 | 813 | | 873 | 905 | 148 | 80 | 87 | 30.4 |
| 1750 x 1753 | 12495 | 26.5 | 61.8 | 14.3 | 13.2 | 72.8 | .51 | 65 | 2.5 | | 902 | 903 | 827 | | 877 | 903 | 150 | 88 | 87 | 27.2 |
| Thatcher$^3$ x Triunfo | 12498 | 24.3 | 61.0 | 15.5 | 15.0 | 76.0 | .54 | 64 | 1.5 | | 845 | 859 | 889 | 911 | 864 | 911 | 147 | 78 | 87 | 31.6 |
| 1750 x 1753 | | 23.6 | 62.4 | 15.0 | 14.4 | 75.1 | .54 | 64 | 2.0 | | 868 | 888 | 801 | | 852 | 888 | 148 | 80 | 87 | 29.3 |
| Merit$^2$ x Thatcher | 12494 | 26.6 | 60.0 | 14.1 | 13.3 | 74.7 | .55 | 67 | 2.5 | | 891 | 882 | 839 | | 871 | 891 | 148 | 83 | 92 | 23.7 |
| Triunfo x Thatcher | | 19.5 | 61.0 | 15.2 | 14.5 | 72.2 | .54 | 62 | 1.5 | | 798 | 839 | 874 | no flour | 837 | 874 | 150 | 75 | 87 | 37.0 |
| Thatcher$^2$ x Triunfo | | 24.3 | 60.5 | 15.6 | 14.7 | 77.1 | .57 | 63 | 1.5 | | 839 | 842 | 856 | 894 | 846 | 894 | 146 | 78 | 90 | 28.5 |
| Thatcher$^3$ x Triunfo | 12497 | 25.3 | 62.0 | 15.1 | 14.0 | 75.7 | .57 | 60 | 1.5 | | 749 | 798 | 792 | | 780 | 798 | 147 | 82 | 85 | 38.6 |
| Average | | 25.0 | 60.7 | 14.9 | 14.1 | 74.8 | .53 | 64 | 2.0 | | 871 | 900 | 858 | | 876 | 910 | 148 | 81 | 88 | |
| Range | | 8.8 | 4.0 | 1.8 | 1.9 | 4.9 | .10 | 7 | 1.0 | | 210 | 220 | 168 | | 140 | 220 | 4 | 20 | 7 | |

Table 7.--Continued.

Langdon, N. D.

| Variety or Cross | C. I. No. | Acre Yield | Test Wt. | Protein | | Flour | | Absorption | Mixing time | Baking Methods and Loaf Volume | | | | | | | Wt. of loaf | Crumb color | Grain Texture | Pearling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | | | | Index value |
| | | | | | | | | | | 0 | 1 | 2 | 3 | 4 | | | | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Gram | Score | Score | Pct. |
| Pilot x Mida | | 23.3 | 61.0 | 15.1 | 14.5 | 75.1 | .40 | 64 | 2.0 | | 916 | 962 | 911 | | 930 | 962 | 149 | 95 | 93 | 27.2 |
| Thatcher | 10003 | 18.5 | 60.0 | 15.1 | 14.6 | 75.1 | .40 | 67 | 2.5 | 934 | 960 | 893 | | | 931 | 960 | 150 | 80 | 90 | 25.6 |
| 1750 x 1753 | | 23.9 | 61.4 | 15.5 | 14.6 | 73.4 | .42 | 69 | 2.5 | 892 | 940 | 931 | | | 921 | 940 | 151 | 90 | 92 | 24.6 |
| 1691 x 1756 | 12541 | 27.1 | 61.4 | 15.0 | 14.0 | 74.4 | .38 | 66 | 2.0 | 868 | 931 | 897 | | | 899 | 931 | 154 | 90 | 93 | 29.3 |
| Pilot x 1514 | | 23.1 | 61.7 | 14.5 | 13.3 | 72.5 | .40 | 68 | 2.5 | 919 | 925 | 859 | | | 901 | 925 | 153 | 80 | 93 | 24.7 |
| Regent x 1139.22 | | 22.4 | 61.5 | 15.0 | 14.4 | 74.2 | .43 | 64 | 2.0 | 871 | 925 | 901 | | | 899 | 925 | 151 | 82 | 93 | 27.3 |
| 1568 x Merit | | 22.7 | 62.4 | 15.6 | 14.8 | 76.1 | .43 | 68 | 2.0 | | 920 | 922 | 922 | | 921 | 922 | 152 | 87 | 92 | 25.2 |
| Rel. H. x H-44-Ceres | | 24.0 | 60.4 | 15.2 | 14.6 | 75.5 | .45 | 65 | 2.5 | 787 | 916 | 897 | | | 867 | 916 | 150 | 77 | 88 | 22.9 |
| Mida | 12008 | 22.4 | 61.8 | 15.1 | 14.3 | 74.8 | .39 | 66 | 2.0 | 789 | 914 | 865 | | | 856 | 914 | 152 | 92 | 92 | 27.6 |
| Regent x 1315 | | 22.1 | 61.5 | 16.1 | 15.0 | 72.8 | .41 | 64 | 2.0 | 882 | 913 | 839 | | | 878 | 913 | 150 | 88 | 95 | 30.3 |
| 1567 x Merit | | 19.5 | 60.0 | 15.0 | 14.2 | 73.8 | .41 | 68 | 2.5 | 800 | 911 | 812 | | | 841 | 911 | 153 | 73 | 88 | 28.1 |
| Baart 1121 x 1581 | | 24.1 | 59.8 | 14.4 | 13.6 | 74.0 | .47 | 69 | 2.5 | 778 | 905 | 900 | | | 861 | 905 | 153 | 82 | 92 | 24.1 |
| Merit$^2$ x Thatcher | 12540 | 26.5 | 60.3 | 14.5 | 13.4 | 72.9 | .44 | 68 | 3.0 | 789 | 889 | 859 | | | 846 | 889 | 152 | 80 | 93 | 20.5 |
| 1568 x Merit | | 24.8 | 62.0 | 14.6 | 13.9 | 75.5 | .41 | 64 | 2.5 | | 876 | 879 | 839 | | 865 | 879 | 152 | 65 | 85 | 25.2 |
| Pilot x 1585 | | 24.6 | 60.0 | 13.7 | 12.9 | 72.4 | .41 | 66 | 2.5 | 859 | 865 | 821 | | | 848 | 865 | 150 | 72 | 92 | 26.2 |
| 1590 x Pilot | | 20.0 | 60.8 | 15.2 | 14.5 | 73.8 | .48 | 69 | 2.0 | 695 | 842 | 836 | | | 791 | 842 | 153 | 75 | 92 | 22.4 |
| Average | | 23.1 | 61.0 | 15.0 | 14.2 | 74.1 | .42 | 67 | 2.3 | | 909 | 880 | | | 878 | 912 | 152 | 82 | 91 | |
| Range | | 8.6 | 2.6 | 2.4 | 2.1 | 3.7 | .10 | 5 | 1.0 | | 118 | 150 | | | 140 | 120 | 5 | 23 | 10 | |

## U. S. D. A., NORTH DAKOTA AND MINNESOTA METHODS

The same composite flours of seven uniform plot varieties for the eastern and western sections were baked for the seventh year by different methods including those used by the North Dakota and Minnesota laboratories. The results from the U. S. D. A. laboratory using the North Dakota and Minnesota methods and the present U. S. D. A. methods are shown in table 8. The varieties are ranked in descending order of loaf volume for all the baking methods used, with the average rank and loaf volume of all seven methods included for comparative purposes.

The western composites averaged about two percent higher protein content than the eastern composites and as would be expected produced larger loaves except the 3-hour fermentation with the North Dakota method. This latter suggests that the 3-hour fermentation is too severe to bring out the full strength of the various varieties. With both the Minnesota and North Dakota methods the 2-hour fermentation gave the larger loaf volumes.

The relative ranking of the varieties is substantially the same regardless of the method used. There are some exceptions, however, indicating there is possibly still much to be accomplished in the way of better procedures or methods of testing.

## COMMERCIAL SAMPLES

As in past years a number of commercially grown wheat samples were obtained through the Grain Branch, Production and Marketing Administration for comparison with the varieties and strains produced in experimental plots. Eighteen such samples, representing a number of grades and types were obtained at Great Falls, Montana, and Minneapolis, and Duluth, Minnesota. The samples were composited by grade from 2289 cars of wheat grading No. 3 or better and represent the better grades of hard red spring wheats received at these markets. This is the eighth season such sahples have been tested. The results are given in table 9.

These samples generally averaged lower in protein content than the experimental plots and nursery samples. Otherwise the milling, baking, and chemical results do not appear to be greatly different, especially when compared with samples having approximately the same protein content and test weight. The correlation coefficient for loaf volume and protein content also was low in comparison with 12 selected varieties and strains. The protein quality, however, was good as based on the loaf volumes adjusted to a 13.0 percent protein basis in comparison with varieties from experimental plots and nurseries.

Table 8.--Uniform Varieties, 1946, composited from Eastern and Western Stations, baked by 7 methods.

| Variety | U.S.D.A. Methods | | | | | | Minnesota Methods | | | | North Dakota Methods | | | | All 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Milligrams of Bromate | | | | | | Fermentation | | | | Fermentation | | | | Methods | |
| | 0 | 1 | 2 | Ave. | Opt. | Rank | 2 hrs. | Rank | 3 hrs. | Rank | 2 hrs. | Rank | 3 hrs. | Rank | Ave. | Rank |
| **Eastern Composite** | | | | | | | | | | | | | | | | |
| Cadet | 865 | 931 | 856 | 884 | 931 | 2 | 727 | 3 | 714 | 2 | 898 | 3 | 891 | 1 | 840 | 1 |
| Regent | 830 | 916 | 824 | 857 | 916 | 3 | 761 | 1 | 738 | 1 | 939 | 2 | 836 | 2 | 835 | 2 |
| Newthatch | 905 | 903 | 830 | 879 | 905 | 4 | 677 | 5 | 621 | 4 | 942 | 1 | 827 | 3 | 815 | 3 |
| Rival | 848 | 854 | 752 | 818 | 854 | 7 | 729 | 2 | 646 | 3 | 836 | 7 | 764 | 4 | 776 | 4 |
| Pilot | 940 | 809 | 747 | 832 | 940 | 1 | 680 | 4 | 598 | 5 | 870 | 4 | 761 | 5 | 772 | 5 |
| Thatcher | 892 | 815 | 767 | 825 | 892 | 5 | 657 | 6 | 592 | 6 | 853 | 6 | 758 | 6 | 762 | 6 |
| Mida | 871 | 856 | 749 | 825 | 871 | 6 | 621 | 7 | 558 | 7 | 865 | 5 | 747 | 7 | 752 | 7 |
| Average | 879 | 869 | 789 | 846 | 901 | | 693 | | 638 | | 886 | | 798 | | 793 | |
| Range | 110 | 122 | 109 | 66 | 86 | | 140 | | 180 | | 106 | | 144 | | 88 | |
| **Western Composite** | | | | | | | | | | | | | | | | |
| Ceres | 965 | 885 | 839 | 896 | 965 | 1 | 750 | 5 | 686 | 4 | 974 | 1 | 806 | 2 | 844 | 1 |
| Newthatch | 928 | 933 | 856 | 906 | 933 | 5 | 812 | 1 | 665 | 5 | 959 | 2 | 744 | 5 | 842 | 2 |
| Thatcher | 937 | 894 | 807 | 879 | 937 | 3 | 752 | 4 | 732 | 1 | 953 | 4 | 775 | 3 | 836 | 3 |
| Cadet | 919 | 937 | 859 | 905 | 937 | 4 | 640 | 7 | 698 | 3 | 959 | 3 | 821 | 1 | 833 | 4 |
| Pilot | 940 | 876 | 792 | 869 | 940 | 2 | 739 | 2 | 715 | 2 | 937 | 5 | 716 | 7 | 824 | 5 |
| Marquis | 905 | 870 | 766 | 847 | 905 | 6 | 761 | 3 | 660 | 6 | 919 | 6 | 746 | 4 | 804 | 6 |
| Mida | 885 | 839 | 792 | 839 | 885 | 7 | 715 | 6 | 640 | 7 | 876 | 7 | 729 | 6 | 782 | 7 |
| Average | 926 | 891 | 816 | 877 | 929 | | 746 | | 685 | | 940 | | 763 | | 824 | |
| Range | 80 | 98 | 93 | 59 | 80 | | 172 | | 92 | | 98 | | 103 | | 62 | |
| **Average of Eastern & Western Composite** | | | | | | | | | | | | | | | | |
| Cadet | 892 | 934 | 858 | 895 | 934 | 2 | 684 | 4 | 706 | 1 | 929 | 2 | 856 | 1 | 837 | 1 |
| Newthatch | 917 | 918 | 843 | 893 | 918 | 3 | 745 | 1 | 643 | 4 | 951 | 1 | 786 | 2 | 829 | 2 |
| Thatcher | 915 | 855 | 787 | 852 | 915 | 4 | 705 | 3 | 662 | 2 | 903 | 4 | 767 | 3 | 799 | 3 |
| Pilot | 940 | 843 | 770 | 851 | 940 | 1 | 735 | 2 | 657 | 3 | 904 | 3 | 740 | 4 | 798 | 4 |
| Mida | 878 | 848 | 771 | 832 | 878 | 5 | 668 | 5 | 599 | 5 | 871 | 5 | 738 | 5 | 768 | 5 |
| Average | 908 | 880 | 806 | 865 | 917 | | 707 | | 653 | | 912 | | 777 | | 806 | |
| Range | 62 | 91 | 88 | 63 | 62 | | 77 | | 107 | | 80 | | 118 | | 69 | |

## CORRELATION AND REGRESSIONS

Correlation coefficients (r) for loaf volume and flour protein content of 12 varieties and strains and also the commercial grade samples have been calculated and are presented in table 10. Also indicated in this table is the slope of the regression line or the cubic centimeter change in loaf volume for each 1.0 percent of protein ($b_1$), the average protein content of the flour and the loaf volumes of the bread, and the loaf volumes adjusted to a 13.0 percent protein basis by the means of the regression equation. The ploted regression lines for each variety and the commercial samples are shown in figures 1 and 2.

The figures show that the relation between loaf volume and protein content is generally linear. These results are in accordance with the last two years' (1944 and 1945) where, with a few exceptions the points fell on or very close to the calculated regression lines. Most of the correlation coefficients for loaf volume and flour protein content are high. The highest coefficients are for Redman, Regent, Rival, Merit x Pilot, N. N. 1764 and Pilot x Mida, N. N. 1756. Among the varieties that were highest last season are Regent, Pilot x Mida, N. N. 1756 and Merit x Pilot N. N. 1764. The wheats having the lowest coefficients this season are Rescue, Henry, Mida, Newthatch, and the commercial grades. It should be noted that the number of samples of each variety is rather small for a study of this kind. This fact should be considered in evaluating the results.

One of the important results of this study and of interest are the differences in the level and particularly in the slope of the regression lines for the different varieties. The regression lines for the varieties and strains (4 varieties grouped together) have been included in separate graphs in figures 1 and 2 with the regression line for Thatcher repreated in each graph as a standard of comparison.

The regression lines (figure 1 graph 1) for Newthatch and Mida are about the same in slope and level but both are slightly lower as contrasted with the slope and level of the line for Thatcher. The slope of the line for Rival is somewhat greater than the slope of the lines for the other varieties compared in this graph. The change in loaf volume for each one percent of protein for Rival is 64.3 cc. It is the highest in this respect among the varieties compared in this and 1 last season. The slope and level of the regression lines (figure 1 graph 2) for Regent, Henry, and Pilot are much alike and average generally higher than the regression line for Thatcher. The loaf volumes of Regent, Henry, and Pilot adjusted to a 13.0 percent protein basis according to the regression equation average high. Only Rescue is higher in loaf volume by the same comparison of the varieties shown in figures 1 and 2.

The regression lines for a number of the new and more promising strains are shown in the two graphs in figure 2. The slope of the lines for Rescue, Redman, and Pilot x Mida 1756 (figure 2 graph 3) compares favorably with the slope of the line for Thatcher. There is some difference in the level of the lines, with Rescue higher than Redman, both exceeding Thatcher, and Pilot x Mida 1756 lower than Thatcher. Rescue and Redman have the smallest change in loaf volume for each one percent of protein of the twelve varieties and strains compared in these figures. The slope of the line for Cadet (figure 2 graph 4) compares favorably with the slope of the line for Thatcher with Mida x Pilot 1764 averaging slightly lower. The commercial grade samples have a much different slope of the regression line, being not as steep as the line for Thatcher.

The relative position of the regression lines appears to be a rather satisfactory measure of the relative protein quality of these varieties. From these lines, the varieties and strains can be compared with each other by the means of loaf volume taken at a medium protein level (13.0 percent) as calculated from the regression lines. The loaf volume for each variety is the point at which the regression line crosses the 13.0 percent protein value in graphs 1 and 2. These loaf volumes arranged in descending order are shown in the last column of table 10.

It is of interest to note that Rescue, Henry and Pilot are highest in loaf volume (converted to 13.0 percent protein level) exceeding Thatcher in this respect. Henry and Pilot were also among the higher varieties last year.

Protein strength or protein quality is by no means the only measure of the suitability of a wheat variety or strain for bread baking purposes. Loaf volume is probably, however, the most important in relation to bread baking. Other flour properties considered important are mixing time, water absorption, oxidation or mixing time, crumb color and grain texture. These quality factors are given in other tables.

Table 9.--Milling, baking, and chemical results on fifteen composite commercial samples of hard red spring wheat obtained at Minneapolis, Minn., Duluth, Minn., and Great Falls, Mont., representing the 1946 crop.

| Location where obtained | Samples composited from car lots | U. S. Grade | Test Wt. | Protein | | Flour | | Water absorption average | Mixing time | Baking Methods and Loaf Volume | | | | | | | Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Milligrams of Bromate | | | | | Aver. 3 best | Optimum | Crumb color | Grain Texture |
| | | | | Wheat | Flour | Yield | Ash | | | 0 | 1 | 2 | 3 | 4 | | | | |
| | | | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Min. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Cc. | Score | Score |
| Minneapolis, Minn. | 153 | 1 Hvy.D.N.S. | 61.3 | 13.4 | 12.7 | 76.3 | .48 | 64 | 2.0 | | 786 | 810 | 755 | | 784 | 810 | 83 | 87 |
| Do | 193 | 1 D.N.S. | 59.9 | 13.5 | 13.0 | 75.2 | .57 | 65 | 2.5 | | 842 | 856 | 801 | | 833 | 856 | 85 | 90 |
| Do | 60 | 2 D.N.S. | 58.6 | 13.8 | 13.0 | 75.6 | .49 | 63 | 2.0 | 877 | 862 | 830 | | | 856 | 877 | 80 | 88 |
| Do | 45 | 3 D.N.S. | 57.1 | 14.1 | 13.5 | 75.4 | .48 | 63 | 2.0 | 851 | 919 | 856 | | | 875 | 919 | 75 | 92 |
| Do | 66 | 1 N.S. | 59.4 | 12.7 | 12.0 | 76.4 | .52 | 63 | 2.0 | 812 | 845 | 781 | | | 813 | 845 | 83 | 92 |
| Do | 102 | 3 N S | 57.4 | 13.4 | 12.7 | 75.1 | .49 | 63 | 2.0 | 818 | 870 | 813 | | | 834 | 870 | 80 | 90 |
| Duluth, Minn. | 191 | 1 Hvy.D.N.S. | 61.5 | 13.4 | 12.7 | 76.3 | .51 | 65 | 2.0 | 806 | 833 | 784 | | | 808 | 833 | 88 | 90 |
| Do | 168 | 1 D.N.S. | 60.0 | 13.7 | 13.1 | 73.9 | .49 | 65 | 2.0 | 853 | 865 | 818 | | | 845 | 865 | 87 | 90 |
| Do | 157 | 2 D.N.S. | 59.5 | 14.0 | 13.3 | 74.6 | .49 | 65 | 2.0 | 865 | 882 | 848 | | | 865 | 882 | 83 | 90 |
| Do | 102 | 3 D.N.S. | 58.2 | 14.1 | 13.7 | 69.9 | .49 | 66 | 2.5 | 911 | 923 | 856 | | | 896 | 922 | 82 | 85 |
| Do | 94 | 1 N.S. | 59.5 | 12.8 | 12.1 | 75.6 | .52 | .64 | 2.0 | 806 | 821 | 772 | | | 800 | 821 | 80 | 87 |
| Do | 75 | 2 N.S. | 59.2 | 12.8 | 12.2 | 75.7 | .49 | 64 | 2.0 | 830 | 821 | 792 | | | 814 | 830 | 85 | 92 |
| Great Falls, Mont. | 127 | 1 Hvy.D.N.S. | 61.1 | 13.1 | 12.6 | 71.2 | .41 | 65 | 2.0 | 761 | 781 | 723 | | | 755 | 781 | 83 | 85 |
| Do | 379 | 1 D.N.S. | 59.7 | 14.3 | 13.7 | 73.0 | .43 | 66 | 2.5 | 848 | 865 | 812 | | | 842 | 865 | 82 | 88 |
| Do | 107 | 2 D.N.S. | 58.2 | 14.8 | 14.1 | 72.7 | .41 | 66 | 2.5 | 839 | 925 | 824 | | | 863 | 925 | 80 | 85 |
| Do | 36 | 2 D.N.S. | 59.8 | 13.9 | 13.3 | 72.1 | .40 | 66 | 2.0 | 815 | 848 | 786 | | | 816 | 848 | 80 | 88 |
| Do | 158 | 3 D.N.S. | 57.0 | 14.9 | 14.3 | 71.5 | .42 | 66 | 2.5 | 858 | 934 | 892 | | | 894 | 934 | 82 | 80 |
| Do | 76 | 1 N.S. | 59.6 | 12.7 | 12.0 | 73.2 | .41 | 66 | 2.5 | 775 | 787 | 726 | | | 763 | 787 | 87 | 88 |
| Average | | | 59.3 | 13.6 | 13.0 | 74.1 | .47 | 65 | 2.2 | | 856 | 810 | | | 831 | 859 | 83 | 88 |
| Range | | | 4.5 | 2.2 | 2.3 | 6.5 | .17 | 3 | .5 | | 153 | 169 | | | 141 | 153 | 13 | 12 |

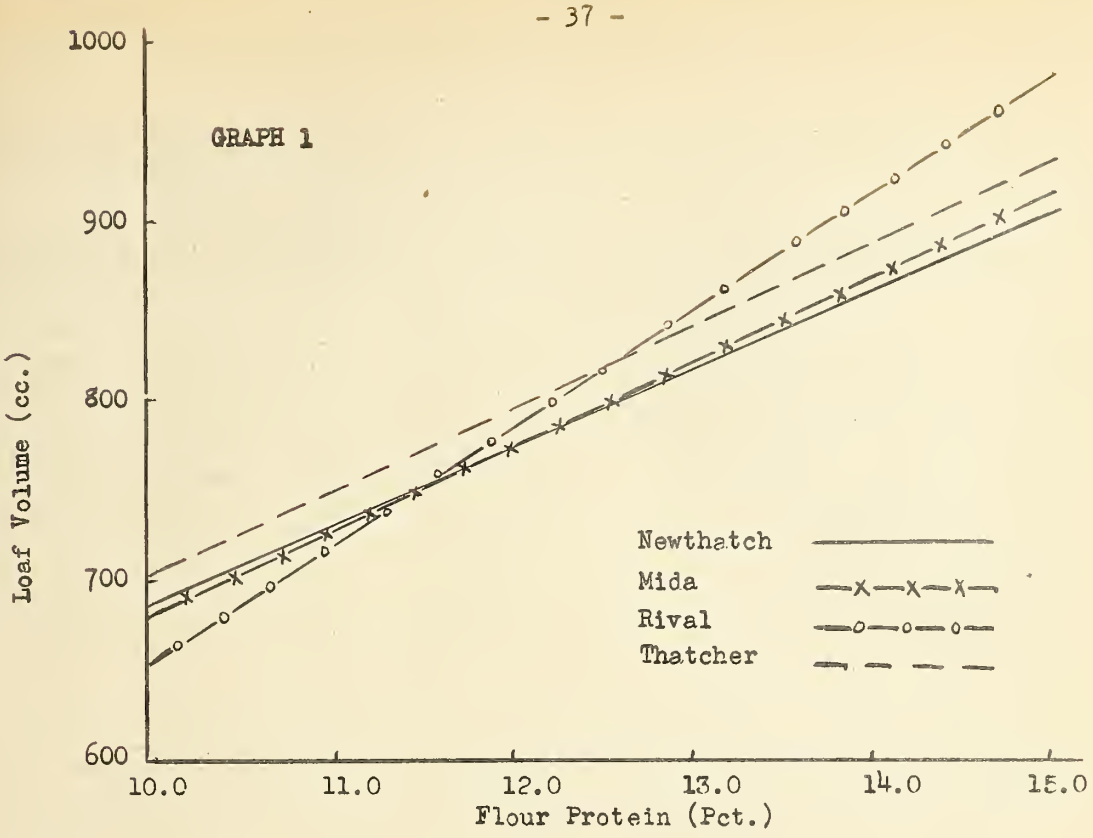
Table 10.--Summary of protein content-loaf volume.

| Variety or Cross | No. of Samples | $b_1$ 1/ | r 2/ | Protein of flour (pct.) | Average loaf volume (cc) | Loaf volume at 13.0 pct. protein content 3/ |
|---|---|---|---|---|---|---|
| Rescue | 7 | 38.5 | .8286 | 14.1 | 931 | 889 |
| Henry | 10 | 54.2 | .8158 | 12.1 | 834 | 883 |
| Pilot | 20 | 46.4 | .8543 | 13.3 | 890 | 876 |
| Regent | 14 | 56.6 | .8932 | 14.0 | 924 | 868 |
| Cadet | 19 | 50.1 | .8547 | 13.7 | 897 | 862 |
| Redman | 9 | 37.8 | .9112 | 13.9 | 895 | 861 |
| Commercial Grades | 18 | 17.2 | .8268 | 13.0 | 859 | 859 |
| Rival | 14 | 64.3 | .8954 | 13.6 | 891 | 852 |
| Thatcher | 25 | 45.8 | .8593 | 13.9 | 883 | 841 |
| Merit x Pilot N 1764 | 14 | 50.9 | .8859 | 13.1 | 841 | 836 |
| Pilot x Mida N 1756 | 12 | 47.8 | .8899 | 12.2 | 788 | 826 |
| Mida | 20 | 46.9 | .8267 | 13.7 | 857 | 825 |
| Newthatch | 19 | 44.4 | .8101 | 14.6 | 891 | 820 |

1/ Slope of the regression line or the cubic centimeter change in loaf volume for each one percent of protein.

2/ Correlation coefficients for loaf volume and flour protein content.

3/ Calculated from regression equation.



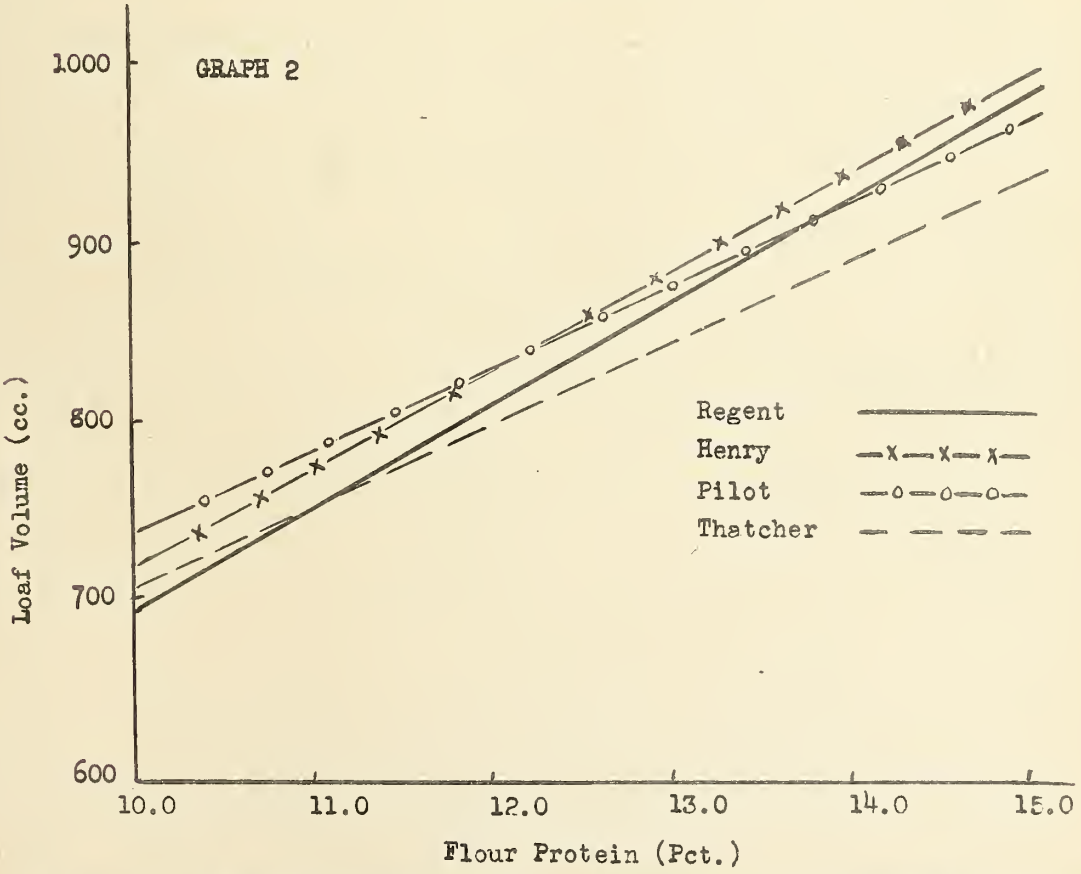
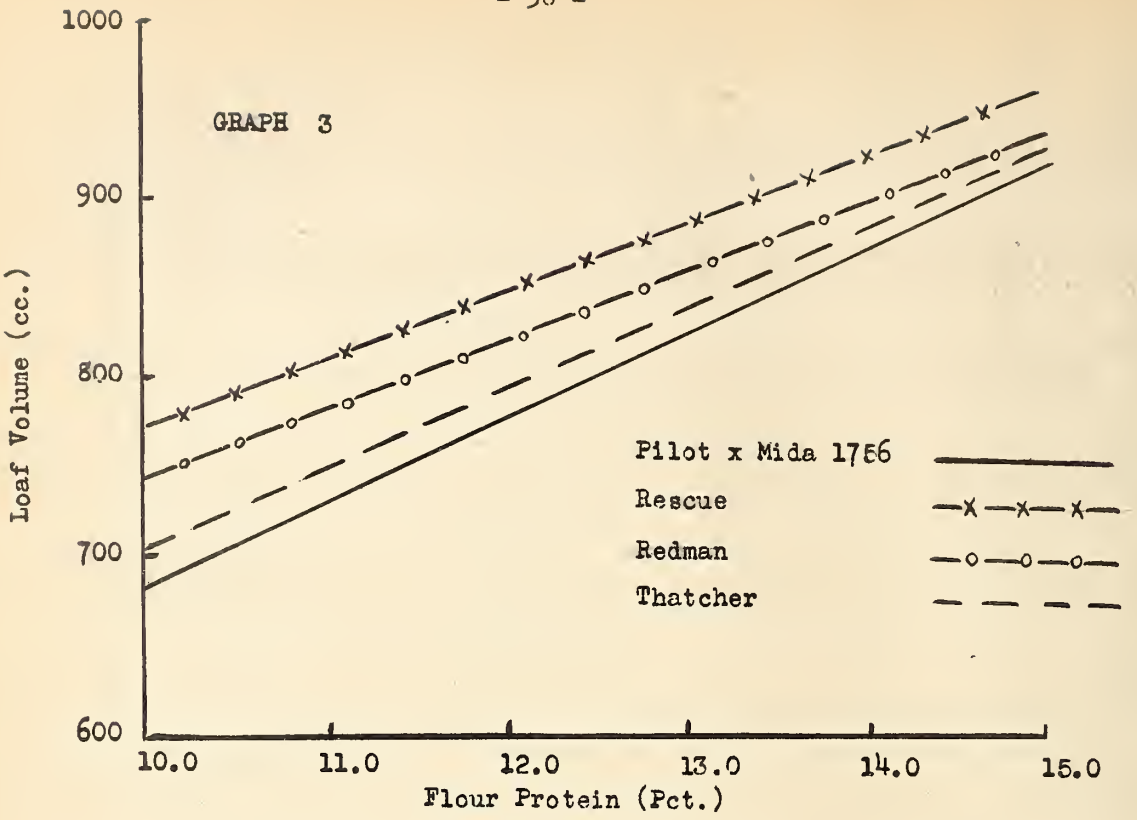




Figure 1. - Regression lines for flour protein and loaf volume for a number of hard red spring varieties and strains with Thatcher included for comparisons, 1946 crop.



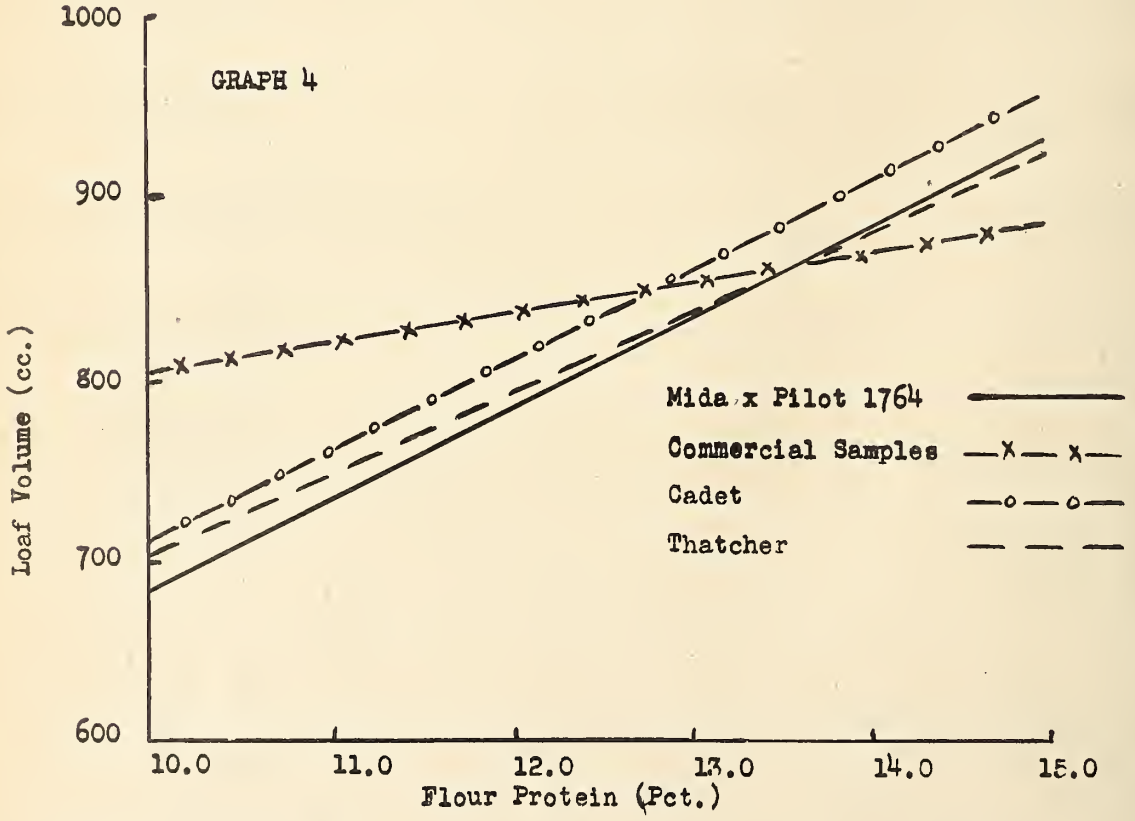




Figure 2. - Regression lines for flour protein and loaf volume for a number of hard red spring varieties and strains with Thatcher included for comparisons, 1946 crop.

Table 11--Average of the milling, baking and chemical properties of 14 wheats, the average of comparable samples of Thatcher, and of each variety as shown in percentage of Thatcher, with the varieties arranged in order of percentage for optimum loaf volume in 1946.

| Variety or Cross | No. of Samples | Yield per Acre | Test Weight | Protein | | Flour | | Absorption | Baking Methods and Loaf Volume | | | Weight of Loaf | Crumb Color | Grain Texture |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wheat | Flour | Yield | Ash | | No. 6 | Average | Optimum | | | |
| | | Bu. | Lbs. | Pct. | Pct. | Pct. | Pct. | Pct. | Cc. | Cc. | Cc. | Grams. | Score | Score |
| Regent | 14 | 24.2 | 59.0 | 14.6 | 14.0 | 74.2 | .48 | 65. | 903 | 892 | 924 | 150 | 82 | 88 |
| Thatcher | 14 | 25.7 | 59.5 | 14.1 | 13.4 | 75.0 | .49 | 64. | 841 | 836 | 865 | 148 | 82 | 86 |
| Percentage of Thatcher | | 94.2 | 99.2 | 103.5 | 104.5 | 98.9 | 98.0 | 101.6 | 107.4 | 106.7 | 106.8 | 101.4 | 100.0 | 102.3 |
| N. 1556 | 4 | 27.9 | 60.6 | 14.3 | 13.5 | 74.5 | 48 | 67 | 871 | 893 | 879 | 152 | 87 | 90 |
| Thatcher | 4 | 28.2 | 60.6 | 13.9 | 13.4 | 75.6 | 48 | 65 | 844 | 856 | 830 | 149 | 82 | 88 |
| Percentage of Thatcher | | 98.9 | 100.0 | 102.9 | 100.7 | 98.5 | 100.0 | 103.1 | 103.2 | 104.3 | 105.9 | 102.0 | 106.1 | 102.3 |
| Rescue | 7 | 20.1 | 59.7 | 14.6 | 14.1 | 73.1 | .41 | 64 | 916 | 888 | 931 | 150 | 79 | 87 |
| Thatcher | 7 | 22.1 | 59.9 | 15.2 | 14.7 | 74.8 | .47 | 65 | 891 | 875 | 903 | 149 | 82 | 88 |
| Percentage of Thatcher | | 91.0 | 99.7 | 96.1 | 95.9 | 97.7 | 93.6 | 98.5 | 102.8 | 101.5 | 103.1 | 100.7 | 96.3 | 98.9 |
| S.D. 2280 | 4 | 30.6 | 60.8 | 14.1 | 13.5 | 77.0 | 48 | 65 | 865 | 871 | 849 | 150 | 88 | 91 |
| Thatcher | 4 | 26.9 | 59.1 | 13.6 | 12.9 | 75.0 | 49 | 65 | 832 | 859 | 828 | 148 | 81 | 87 |
| Percentage of Thatcher | | 113.8 | 102.9 | 103.7 | 104.7 | 102.7 | 98.0 | 100.0 | 104.0 | 101.4 | 102.5 | 101.4 | 108.6 | 104.6 |
| Rival | 14 | 30.2 | 60.1 | 14.4 | 13.6 | 76.6 | .51 | 67 | 879 | 863 | 891 | 151 | 85 | 89 |
| Thatcher | 14 | 26.9 | 59.6 | 14.3 | 13.6 | 74.8 | .48 | 65 | 852 | 843 | 871 | 148 | 82 | 87 |
| Percentage of Thatcher | | 112.3 | 100.8 | 100.7 | 100.0 | 102.4 | 106.3 | 103.1 | 103.2 | 102.4 | 102.3 | 102.0 | 103.7 | 102.3 |
| Cadet | 19 | 26.1 | 58.3 | 14.4 | 13.7 | 73.4 | .50 | 67 | 871 | 858 | 897 | 151 | 90 | 89 |
| Thatcher | 19 | 25.4 | 59.2 | 14.5 | 13.8 | 74.6 | .48 | 65 | 852 | 842 | 877 | 148 | 82 | 86 |
| Percentage of Thatcher | | 102.8 | 98.5 | 99.3 | 99.3 | 98.4 | 104.2 | 103.1 | 102.2 | 101.9 | 102.3 | 102.0 | 109.8 | 103.5 |
| Redman | 9 | 25.1 | 58.5 | 14.4 | 13.9 | 74.9 | .48 | 65 | 875 | 859 | 895 | 150 | 87 | 87 |
| Thatcher | 9 | 25.2 | 59.0 | 14.4 | 13.7 | 74.4 | .48 | 64 | 870 | 854 | 878 | 149 | 81 | 88 |
| Percentage of Thatcher | | 99.6 | 99.2 | 100.0 | 101.5 | 100.7 | 100.0 | 101.6 | 100.6 | 100.6 | 101.9 | 100.7 | 107.4 | 98.9 |
| Newthatch | 19 | 24.9 | 58.3 | 15.2 | 14.6 | 71.7 | .50 | 65 | 881 | 875 | 891 | 150 | 83 | 88 |
| Thatcher | 19 | 25.4 | 59.2 | 14.5 | 13.8 | 74.6 | .48 | 65 | 852 | 842 | 877 | 148 | 82 | 86 |
| Percentage of Thatcher | | 98.0 | 98.5 | 104.8 | 105.8 | 100.1 | 104.2 | 100.0 | 103.4 | 103.9 | 101.6 | 101.4 | 101.2 | 102.3 |
| Pilot | 20 | 25.8 | 58.7 | 14.3 | 13.3 | 72.7 | .45 | 64 | 845 | 841 | 890 | 150 | 85 | 87 |
| Thatcher | 20 | 25.2 | 59.1 | 14.6 | 13.9 | 74.4 | .48 | 65 | 857 | 846 | 881 | 148 | 82 | 86 |
| Percentage of Thatcher | | 102.4 | 9.3 | 97.9 | 95.7 | 97.7 | 93.8 | 98.5 | 98.6 | 99.4 | 101.0 | 101.4 | 103.7 | 101.2 |
| N. 1753 | 3 | 24.6 | 61.0 | 13.8 | 12.9 | 72.2 | .44 | 64 | 818 | 821 | 878 | 148 | 84 | 87 |
| Thatcher | 3 | 24.6 | 60.6 | 14.6 | 14.3 | 75.8 | .48 | 66 | 858 | 842 | 873 | 149 | 85 | 89 |
| Percentage of Thatcher | | 100.0 | 100.7 | 94.5 | 90.2 | 95.3 | 91.7 | 97.0 | 95.3 | 97.5 | 100.6 | 99.3 | 98.8 | 97.8 |
| 1831 | 5 | 30.9 | 60.3 | 13.9 | 13.3 | 75.5 | .43 | 66 | 873 | 855 | 885 | 150 | 83 | 89 |
| Thatcher | 5 | 28.3 | 60.4 | 14.6 | 14.1 | 75.0 | .47 | 65 | 874 | 861 | 883 | 149 | 83 | 90 |
| Percentage of Thatcher | | 109.2 | 99.8 | 95.2 | 94.3 | 100.7 | 91.5 | 101.5 | 99.9 | 99.3 | 100.2 | 100.7 | 100.0 | 98.9 |
| Henry | 10 | 31.6 | 59.9 | 13.0 | 12.1 | 75.9 | .48 | 63 | 820 | 809 | 834 | 150 | 76 | 85 |
| Thatcher | 10 | 24.9 | 59.2 | 14.1 | 13.3 | 74.2 | .50 | 64 | 842 | 830 | 854 | 149 | 81 | 86 |
| Percentage of Thatcher | | 126.9 | 101.2 | 92.2 | 91.0 | 102.3 | 96.0 | 98.4 | 97.4 | 97.5 | 97.7 | 100.7 | 93.8 | 98.8 |
| Mida | 20 | 25.9 | 60.9 | 14.5 | 13.7 | 76.0 | .48 | 65 | 840 | 824 | 857 | 152 | 89 | 89 |
| Thatcher | 20 | 25.0 | 59.0 | 14.5 | 13.9 | 74.6 | .49 | 65 | 860 | 850 | 883 | 148 | 82 | 86 |
| Percentage of Thatcher | | 103.6 | 103.2 | 100.0 | 98.6 | 101.9 | 98.0 | 100.0 | 97.7 | 96.9 | 97.1 | 102.7 | 108.5 | 103.5 |
| N. 1764 | 14 | 26.8 | 59.2 | 13.9 | 13.1 | 72.7 | .52 | 67 | 814 | 803 | 841 | 152 | 86 | 87 |
| Thatcher | 14 | 25.5 | 59.3 | 14.2 | 13.5 | 74.9 | .49 | 65 | 850 | 837 | 867 | 148 | 83 | 86 |
| Percentage of Thatcher | | 105.1 | 99.8 | 97.9 | 97.0 | 97.1 | 106.1 | 103.1 | 95.8 | 95.9 | 97.0 | 102.7 | 103.6 | 101.2 |
| N. 1756 | 12 | 30.1 | 61.4 | 13.1 | 12.2 | 75.1 | .44 | 63 | 767 | 753 | 788 | 151 | 87 | 88 |
| Thatcher | 12 | 25.8 | 59.1 | 14.0 | 13.4 | 74.8 | .50 | 64 | 842 | 827 | 858 | 148 | 83 | 86 |
| Percentage of Thatcher | | 116.7 | 103.9 | 93.6 | 91.0 | 100.4 | 88.0 | 98.4 | 91.1 | 91.1 | 91.8 | 102.0 | 104.8 | 102.3 |

Table 12.--Annual and total number of samples comparable with Thatcher and weighted average milling, baking, and chemical properties expressed in percentage of Thatcher for the 9 years, 1938 to 1946.

| Variety State or Nursery No. | Crop year and number of samples | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Total |
| Thatcher | 11 | 12 | 14 | 16 | 18 | 20 | 18 | 23 | 20 | 152 |
| Pilot | 8 | 11 | 14 | 13 | 14 | 14 | 16 | 19 | 20 | 129 |
| Rival | 8 | 9 | 9 | 13 | 11 | 12 | 10 | 11 | 14 | 97 |
| Cadet | -- | -- | 2 | 10 | 16 | 13 | 14 | 18 | 19 | 92 |
| Mida | -- | 2 | 9 | 10 | 7 | 8 | 14 | 18 | 20 | 88 |
| Newthatch | -- | -- | 2 | 9 | 12 | 12 | 14 | 18 | 19 | 84 |
| Regent | 2 | 4 | 7 | 10 | 9 | 12 | 10 | 12 | 14 | 80 |
| N. No. 1764 | -- | -- | -- | -- | -- | 2 | 13 | 17 | 14 | 46 |
| N. No. 1756 | -- | -- | -- | -- | -- | 4 | 7 | 13 | 12 | 36 |
| Henry | -- | -- | -- | -- | 3 | 6 | 6 | 5 | 10 | 30 |
| S. D. 2280 | -- | -- | -- | -- | 4 | 4 | 2 | 3 | 4 | 17 |
| N. No. 1556 | -- | -- | -- | -- | -- | 4 | 4 | 5 | 4 | 17 |
| N. No. 1753 | -- | -- | -- | -- | -- | 3 | 5 | 5 | 3 | 16 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 5 | 7 | 12 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 4 | 5 | 9 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 9 | 9 |

| Variety State or Nursery No. | Test weight per bushel | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Weighted Average |
| Mida | -- | 104.8 | 105.6 | 107.9 | 106.5 | 104.1 | 102.9 | 106.2 | 103.2 | 104.9 |
| N. No. 1756 | -- | -- | -- | -- | -- | 105.5 | 104.1 | 105.1 | 103.9 | 104.5 |
| S.D. 2280 | -- | -- | -- | -- | 101.4 | 103.6 | 103.1 | 104.7 | 102.9 | 103.0 |
| Henry | -- | -- | -- | -- | 102.4 | 103.0 | 101.4 | 104.7 | 101.2 | 102.2 |
| Rival | 105.1 | 100.7 | 100.2 | 103.6 | 102.6 | 101.0 | 100.3 | 105.4 | 100.8 | 102.1 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 103.9 | 99.8 | 101.6 |
| N. No. 1753 | -- | -- | -- | -- | -- | 102.3 | 101.7 | 101.6 | 100.7 | 101.5 |
| N. No. 1556 | -- | -- | -- | -- | -- | 101.1 | 100.7 | 101.7 | 100.0 | 100.9 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 102.5 | 99.7 | 100.8 |
| Pilot | 100.9 | 100.0 | 100.5 | 102.3 | 101.6 | 100.2 | 100.0 | 100.9 | 99.3 | 100.4 |
| Regent | 101.5 | 97.0 | 98.6 | 102.6 | 102.3 | 100.9 | 99.3 | 100.9 | 99.2 | 100.4 |
| N. No. 1764 | -- | -- | -- | -- | -- | 102.0 | 99.8 | 100.9 | 99.8 | 100.2 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Cadet | -- | -- | 98.8 | 100.4 | 101.0 | 98.5 | 99.7 | 99.5 | 98.5 | 99.5 |
| Newthatch | -- | -- | 99.8 | 101.3 | 101.0 | 98.5 | 99.3 | 98.9 | 98.5 | 99.3 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 99.2 | 99.2 |

| Variety State or Nursery No. | Crude protein content of the wheat | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Average |
| Newthatch | -- | -- | 102.4 | 108.9 | 107.8 | 106.1 | 104.4 | 104.9 | 104.8 | 105.6 |
| Regent | 106.0 | 103.1 | 102.5 | 106.8 | 106.1 | 104.7 | 104.6 | 101.5 | 103.5 | 104.1 |
| S.D. 2280 | -- | -- | -- | -- | 104.8 | 101.9 | 100.7 | 103.0 | 103.7 | 103.1 |
| N. 1556 | -- | -- | -- | -- | -- | 102.0 | 101.5 | 103.5 | 102.9 | 102.5 |
| Cadet | -- | -- | 100.0 | 104.8 | 104.9 | 103.6 | 101.5 | 101.4 | 99.3 | 102.2 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 100.0 | 100.0 |
| N. No. 1753 | -- | -- | -- | -- | -- | 104.6 | 102.8 | 96.5 | 94.5 | 99.6 |
| N. No. 1764 | -- | -- | -- | -- | -- | 101.9 | 101.5 | 99.3 | 97.9 | 99.6 |
| Mida | -- | 97.6 | 95.6 | 102.0 | 102.1 | 107.6 | 98.5 | 96.5 | 100.0 | 99.6 |
| Rival | 100.0 | 94.2 | 97.5 | 100.7 | 100.7 | 101.3 | 100.8 | 98.6 | 100.7 | 99.6 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 97.0 | 96.1 | 96.5 |
| Pilot | 102.0 | 94.2 | 100.0 | 100.7 | 98.6 | 99.3 | 97.0 | 97.2 | 97.9 | 98.3 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 94.6 | 95.2 | 94.9 |
| N. No. 1756 | -- | -- | -- | -- | -- | 97.3 | 94.3 | 94.4 | 93.6 | 94.5 |
| Henry | -- | -- | -- | -- | 97.8 | 95.3 | 92.6 | 93.9 | 92.2 | 93.7 |

Table 12.--Continued

| Variety State or Nursery No. | Loaf Volume, Method No. 6 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Average |
| N. No. 1753 | -- | -- | -- | -- | -- | 107.7 | 106.8 | 102.9 | 95.3 | 103.5 |
| Regent | 109.8 | 100.1 | 99.9 | 105.0 | 103.6 | 95.0 | 105.6 | 102.8 | 107.4 | 102.9 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 103.1 | 102.8 | 102.9 |
| Newthatch | -- | -- | 97.4 | 103.7 | 103.3 | 99.4 | 103.4 | 101.6 | 103.4 | 102.3 |
| S.D. 2280 | -- | -- | -- | -- | 104.8 | 98.6 | 94.1 | 101.5 | 104.0 | 101.3 |
| Cadet | -- | -- | 97.9 | 102.2 | 100.5 | 97.1 | 103.0 | 100.1 | 102.2 | 100.7 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 100.6 | 100.6 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| N. No. 1831 | -- | - | -- | -- | -- | -- | -- | 98.9 | 99.8 | 99.5 |
| Pilot | 97.3 | 95.8 | 98.0 | 99.6 | 101.1 | 100.6 | 98.9 | 101.6 | 98.6 | 99.4 |
| Rival | 95.4 | 94.2 | 90.3 | 97.1 | 101.7 | 99.6 | 106.8 | 99.0 | 103.2 | 99.0 |
| N. No. 1764 | -- | -- | -- | -- | -- | 96.1 | 101.9 | 97.6 | 95.8 | 98.2 |
| N. 1556 | -- | -- | -- | -- | -- | 85.3 | 99.9 | 98.8 | 103.2 | 96.9 |
| Henry | -- | -- | -- | -- | 99.2 | 90.8 | 96.7 | 99.5 | 97.4 | 96.5 |
| Mida | -- | 87.7 | 88.8 | 91.5 | 98.4 | 98.6 | 98.8 | 96.7 | 97.7 | 96.0 |
| N. No. 1756 | -- | -- | -- | -- | -- | 90.4 | 96.0 | 95.5 | 91.1 | 93.6 |

| Variety State or Nursery No. | Loaf Volume, Average | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Average |
| N. No. 1753 | -- | -- | -- | -- | -- | 103.7 | 106.6 | 102.5 | 97.5 | 103.0 |
| Regent | 101.6 | 98.6 | 99.8 | 102.8 | 101.9 | 91.4 | 106.0 | 104.0 | 106.7 | 102.1 |
| Newthatch | -- | -- | 97.8 | 102.2 | 102.6 | 99.8 | 101.6 | 101.6 | 103.9 | 101.9 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 100.5 | 101.5 | 101.0 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 100.6 | 100.6 |
| Cadet | -- | -- | 97.7 | 100.2 | 98.4 | 94.9 | 104.1 | 102.5 | 101.9 | 100.4 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 101.7 | 99.3 | 100.3 |
| Pilot | 102.7 | 97.3 | 99.0 | 100.1 | 103.0 | 103.4 | 97.3 | 100.2 | 99.4 | 100.1 |
| S.D. 2280 | -- | -- | -- | -- | 104.1 | 96.7 | 96.5 | 99.6 | 101.4 | 100.1 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| N. No. 1556 | -- | -- | -- | -- | -- | 85.0 | 101.7 | 104.6 | 104.3 | 99.3 |
| Rival | 99.0 | 94.0 | 91.0 | 95.9 | 101.0 | 100.0 | 104.1 | 99.4 | 102.4 | 98.8 |
| N. No. 1764 | -- | -- | -- | -- | -- | 94.8 | 101.3 | 98.4 | 95.9 | 98.3 |
| Henry | -- | -- | -- | -- | 96.5 | 89.5 | 97.6 | 99.2 | 97.9 | 96.2 |
| Mida | -- | 91.5 | 87.2 | 91.9 | 98.6 | 98.8 | 96.4 | 95.6 | 96.9 | 95.3 |
| N. No. 1756 | -- | -- | -- | -- | -- | 92.5 | 94.2 | 94.6 | 91.1 | 93.1 |

| Variety State or Nursery No. | Loaf Volume, Optimum | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Average |
| N. No. 1753 | -- | -- | -- | -- | -- | 107.0 | 105.9 | 101.5 | 100.6 | 103.7 |
| Regent | 106.6 | 99.7 | 100.5 | 104.9 | 103.1 | 95.3 | 105.9 | 103.4 | 106.8 | 102.8 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 101.0 | 103.1 | 102.2 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 101.9 | 101.9 |
| Newthatch | -- | -- | 97.4 | 103.4 | 103.0 | 99.9 | 101.6 | 100.9 | 101.6 | 101.4 |
| S.D. 2280 | -- | -- | -- | -- | 104.7 | 98.9 | 97.2 | 101.6 | 102.5 | 101.3 |
| Cadet | -- | -- | 97.9 | 101.5 | 100.0 | 97.2 | 104.1 | 101.5 | 102.3 | 101.1 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 100.7 | 100.2 | 100.4 |
| Pilot | 99.3 | 96.0 | 98.5 | 100.0 | 101.4 | 100.6 | 97.8 | 100.3 | 101.0 | 100.4 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| N. No. 1556 | -- | -- | -- | -- | -- | 85.3 | 102.3 | 104.3 | 105.9 | 99.7 |
| Rival | 97.3 | 93.9 | 92.1 | 96.6 | 101.2 | 99.8 | 104.2 | 98.6 | 102.3 | 98.8 |
| N. No. 1764 | -- | -- | -- | -- | -- | 96.1 | 100.8 | 98.0 | 97.0 | 98.4 |
| Henry | -- | -- | -- | -- | 98.9 | 90.8 | 97.8 | 97.7 | 97.7 | 96.4 |
| Mida | -- | 88.4 | 88.0 | 91.4 | 98.2 | 98.6 | 96.4 | 96.3 | 97.1 | 95.4 |
| N. No. 1756 | -- | -- | -- | -- | -- | 90.4 | 94.9 | 95.2 | 91.8 | 93.5 |

Table 12.--Continued

| Variety State or Nursery No. | Yield of Flour | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Weighted Average |
| Henry | -- | -- | -- | -- | 102.8 | 102.5 | 102.4 | 104.4 | 102.3 | 102.7 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 105.2 | 100.7 | 102.7 |
| Rival | 105.5 | 102.7 | 99.4 | 103.1 | 101.2 | 103.4 | 101.9 | 104.4 | 102.4 | 102.6 |
| S.D. 2280 | -- | -- | -- | -- | 101.7 | 101.7 | 101.0 | 105.6 | 102.7 | 102.5 |
| Mida | -- | 100.7 | 102.3 | 102.5 | 102.7 | 101.9 | 102.1 | 103.8 | 101.9 | 102.4 |
| Newthatch | -- | -- | 102.5 | 100.9 | 101.7 | 101.4 | 101.2 | 101.3 | 100.1 | 101.1 |
| N. No. 1756 | -- | -- | -- | -- | -- | 99.6 | 99.9 | 102.1 | 100.4 | 100.8 |
| Regent | 100.9 | 98.4 | 100.0 | 100.9 | 99.7 | 102.3 | 99.5 | 100.8 | 98.9 | 100.3 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 100.1 | 100.1 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Cadet | -- | -- | 99.3 | 99.6 | 100.0 | 100.8 | 99.2 | 99.2 | 98.4 | 99.4 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 100.6 | 97.7 | 98.9 |
| N. No. 1556 | -- | -- | -- | -- | -- | 98.5 | 99.3 | 100.1 | 98.5 | 99.2 |
| Pilot | 98.5 | 99.3 | 98.2 | 99.4 | 99.9 | 99.7 | 98.1 | 99.3 | 97.7 | 98.1 |
| N. No. 1764 | -- | -- | -- | -- | -- | 96.9 | 98.2 | 98.7 | 97.1 | 98.0 |
| N. No. 1753 | -- | -- | -- | -- | -- | 97.2 | 97.1 | 99.0 | 95.3 | 97.3 |

| Variety State or Nursery No. | Ash in Flour | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Weighted Average |
| N. No. 1764 | -- | -- | -- | -- | -- | 109.2 | 104.0 | 108.3 | 106.1 | 106.4 |
| Cadet | -- | -- | 123.9 | 113.5 | 105.7 | 107.1 | 100.0 | 102.1 | 104.2 | 105.2 |
| Newthatch | -- | -- | 126.1 | 111.5 | 101.9 | 107.1 | 102.0 | 104.3 | 104.2 | 105.0 |
| Rival | 96.1 | 104.0 | 107.5 | 105.8 | 98.1 | 109.1 | 101.9 | 106.5 | 106.3 | 104.2 |
| Regent | 104.0 | 111.3 | 115.4 | 103.8 | 92.3 | 100.0 | 98.1 | 100.0 | 98.0 | 100.9 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 100.0 | 100.0 |
| N. No. 1753 | -- | -- | -- | -- | -- | 103.6 | 95.9 | 102.1 | 91.7 | 98.4 |
| Mida | -- | 85.5 | 100.0 | 105.9 | 92.3 | 94.7 | 96.1 | 93.6 | 98.0 | 96.8 |
| Pilot | 100.0 | 98.0 | 100.0 | 101.9 | 96.2 | 98.1 | 90.0 | 95.7 | 93.8 | 96.5 |
| N. No. 1556 | -- | -- | -- | -- | -- | 101.9 | 96.1 | 89.4 | 100.0 | 96.4 |
| S.D. 2280 | -- | -- | -- | -- | 101.7 | 93.1 | 90.0 | 91.5 | 98.0 | 95.6 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 94.0 | 93.6 | 93.8 |
| Henry | -- | -- | -- | -- | 87.7 | 93.1 | 90.6 | 93.8 | 96.0 | 93.1 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 90.2 | 91.5 | 90.9 |
| N. No. 1756 | -- | -- | -- | -- | -- | 100.0 | 86.0 | 87.5 | 88.0 | 88.8 |

| Variety State or Nursery No. | Water Absorption of Flour | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Weigated Average |
| N. No. 1764 | -- | -- | -- | -- | -- | 109.2 | 106.3 | 106.3 | 103.1 | 105.4 |
| Cadet | -- | -- | 109.2 | 104.8 | 106.7 | 104.2 | 104.7 | 104.8 | 103.1 | 104.8 |
| Rival | 103.9 | 100.5 | 102.2 | 103.2 | 105.0 | 102.7 | 101.6 | 104.8 | 103.1 | 103.1 |
| N. No. 1753 | -- | -- | -- | -- | -- | 105.4 | 103.1 | 103.2 | 97.0 | 102.4 |
| N. No. 1556 | -- | -- | -- | -- | -- | 101.6 | 101.7 | 103.1 | 103.1 | 102.4 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 101.6 | 101.6 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 101.6 | 101.5 | 101.5 |
| Newthatch | -- | -- | 104.6 | 101.1 | 102.1 | 100.6 | 100.0 | 101.6 | 100.0 | 100.9 |
| S.D. 2280 | -- | -- | -- | -- | 100.0 | 103.3 | 103.1 | 98.4 | 100.0 | 100.8 |
| Regent | 100.7 | 99.1 | 100.5 | 101.6 | 101.6 | 99.4 | 98.4 | 101.6 | 101.6 | 100.7 |
| Mida | -- | 97.3 | 99.8 | 98.4 | 101.6 | 100.5 | 100.0 | 101.6 | 100.0 | 100.3 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Pilot | 97.8 | 98.9 | 100.5 | 100.0 | 100.0 | 98.5 | 98.4 | 100.0 | 98.5 | 99.2 |
| N. No. 1756 | -- | -- | -- | -- | -- | 98.4 | 98.4 | 100.0 | 98.4 | 99.0 |
| Henry | -- | -- | -- | -- | 100.0 | 99.3 | 98.4 | 100.0 | 98.4 | 99.0 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 98.4 | 98.5 | 98.5 |

Table 12.--Continued

| Variety State or Nursery No. | Crumb Color, Average | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Weighted Average |
| Mida | -- | 108.8 | 103.6 | 111.1 | 107.0 | 108.4 | 105.9 | 108.1 | 108.5 | 107.6 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 107.4 | 107.4 |
| N. No. 1756 | -- | -- | -- | -- | -- | 108.6 | 107.2 | 108.4 | 104.8 | 107.0 |
| Cadet | -- | -- | 101.1 | 111.1 | 105.8 | 100.0 | 105.9 | 107.4 | 109.8 | 106.5 |
| Pilot | 109.5 | 101.7 | 100.1 | 103.6 | 105.8 | 106.0 | 103.5 | 104.8 | 103.7 | 104.1 |
| N. No. 1764 | -- | -- | -- | -- | -- | 108.8 | 102.3 | 104.2 | 103.6 | 103.6 |
| Rival | 108.9 | 98.2 | 96.4 | 103.6 | 105.8 | 104.8 | 104.7 | 104.9 | 103.7 | 103.5 |
| N. No. 1556 | -- | -- | -- | -- | -- | 97.5 | 102.4 | 108.4 | 106.1 | 103.8 |
| S.D. 2280 | -- | -- | -- | -- | 103.4 | 102.5 | 97.7 | 97.8 | 108.6 | 102.7 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 102.5 | 100.0 | 101.1 |
| N. No. 1753 | -- | -- | -- | -- | -- | 106.2 | 98.0 | 102.5 | 98.8 | 101.0 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Newthatch | -- | -- | 94.3 | 107.6 | 100.0 | 96.4 | 98.8 | 98.2 | 101.2 | 99.7 |
| Regent | 97.5 | 95.7 | 97.7 | 103.7 | 103.5 | 92.8 | 102.4 | 100.0 | 100.0 | 99.6 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 97.5 | 96.3 | 96.8 |
| Henry | -- | -- | -- | -- | 90.0 | 91.5 | 88.8 | 96.8 | 93.8 | 92.7 |

| Variety State or Nursery No. | Grain Texture, Average | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | Weighted Average |
| S. D. 2280 | -- | -- | -- | -- | 102.2 | 104.9 | 102.2 | 101.1 | 104.6 | 103.2 |
| N. No. 1756 | -- | -- | -- | -- | -- | 104.8 | 102.3 | 101.8 | 102.3 | 102.3 |
| Cadet | -- | -- | 94.4 | 102.3 | 101.1 | 97.6 | 104.7 | 102.1 | 103.5 | 101.8 |
| Pilot | 104.6 | 99.9 | 97.0 | 101.2 | 102.3 | 103.6 | 102.3 | 101.1 | 101.2 | 101.4 |
| Mida | -- | 103.4 | 97.8 | 101.1 | 101.1 | 104.7 | 101.2 | 101.3 | 103.5 | 101.4 |
| Rival | 99.3 | 99.0 | 94.3 | 101.2 | 101.1 | 103.6 | 102.3 | 101.6 | 102.3 | 100.8 |
| N. No. 1764 | -- | -- | -- | -- | -- | 108.8 | 100.0 | 100.0 | 101.2 | 100.7 |
| Newthatch | -- | -- | 96.6 | 100.0 | 101.1 | 100.0 | 101.2 | 100.0 | 102.3 | 100.8 |
| N. No. 1753 | -- | -- | -- | -- | -- | 101.2 | 99.0 | 101.1 | 97.8 | 100.2 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Rescue | -- | -- | -- | -- | -- | -- | -- | 101.2 | 98.9 | 99.9 |
| N. No. 1831 | -- | -- | -- | -- | -- | -- | -- | 101.1 | 98.9 | 99.9 |
| Redman | -- | -- | -- | -- | -- | -- | -- | -- | 98.9 | 98.9 |
| Regent | 95.9 | 93.5 | 93.3 | 98.9 | 100.0 | 96.1 | 102.3 | 98.9 | 102.3 | 98.8 |
| N. No. 1556 | -- | -- | -- | -- | -- | 92.9 | 98.9 | 101.1 | 102.3 | 99.1 |
| Henry | -- | -- | -- | -- | 98.8 | 96.4 | 96.6 | 96.6 | 98.8 | 97.5 |

| Variety State or Nursery No. | Summary of all tests for seven properties | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Test Weight | Wheat Protein | Flour Yield | Absorption | Opt. Volume | Crumb Color | Grain Texture | Average 7 Properties |
| S.D. 2280 | 103.0 | 103.1 | 102.5 | 100.8 | 101.3 | 102.7 | 103.2 | 102.3 |
| Cadet | 99.5 | 102.2 | 99.4 | 104.8 | 101.1 | 106.5 | 101.8 | 102.1 |
| Mida | 104.9 | 99.6 | 102.4 | 100.3 | 96.4 | 107.6 | 101.4 | 101.6 |
| Rival | 102.1 | 99.6 | 102.6 | 103.1 | 98.8 | 103.5 | 100.8 | 101.5 |
| Redman | 99.2 | 100.0 | 100.1 | 101.6 | 101.9 | 107.4 | 98.9 | 101.3 |
| Newthatch | 99.3 | 105.6 | 101.1 | 100.9 | 101.4 | 99.7 | 100.8 | 101.2 |
| N. No. 1556 | 100.9 | 102.5 | 99.2 | 102.4 | 99.7 | 103.8 | 99.1 | 101.0 |
| Regent | 100.4 | 104.1 | 100.3 | 100.7 | 102.8 | 99.6 | 98.8 | 100.9 |
| N. No. 1753 | 101.5 | 99.6 | 97.3 | 102.4 | 103.7 | 101.0 | 100.2 | 100.8 |
| N. No. 1764 | 100.2 | 99.6 | 98.0 | 105.1 | 98.1 | 103.6 | 100.7 | 100.8 |
| N. No. 1831 | 101.6 | 91.9 | 102.7 | 101.5 | 100.4 | 101.1 | 99.9 | 100.3 |
| N. No. 1756 | 104.5 | 94.5 | 100.8 | 99.0 | 93.5 | 107.0 | 102.3 | 100.2 |
| Pilot | 100.4 | 98.3 | 98.1 | 99.2 | 100.4 | 104.1 | 101.4 | 100.2 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Rescue | 100.8 | 96.5 | 98.9 | 98.5 | 102.2 | 96.8 | 99.9 | 99.1 |
| Henry | 102.2 | 93.7 | 102.7 | 99.0 | 96.4 | 92.7 | 97.5 | 97.7 |

## SUMMARY; COMPARABLE SAMPLES 1946

In table 12, the properties of the 1946 samples of 15 varieties or strains of hard red spring wheat are compared with those of Thatcher grown in the same tests. The varieties are arranged in order of percentage for the optimum loaf volume.

## SUMMARY; COMPARABLE SAMPLES 1938 to 1946

Table 13 gives the averages (4 to 9 years) of the milling, baking, and chemical properties of 15 varieties and strains, expressed as a percentage of comparable samples of Thatcher. These include the leading commercial varieties grown in the region and the most promising new hybrid strains that have been tested. The total number of samples tested of each variety or strain varied from 9 to 152. The more important quality comparisons shown in the summary table 13 will be discussed in relation to Thatcher as 100 percent.

## THATCHER

Thatcher has been a uniform variety in the plot experiments since 1932. It was distributed for commercial growing in 1934. It is resistant to stem rust, is early, has short, strong straw and yields well. Its commercial acreage increased rapidly until it became the most widely grown variety in 1938. It probably reached its peak in 1941 when it was grown on about 6 million acres in the United States and 9 or 10 million acres in Canada. Being suceptible to leaf rust, it was injured severely in 1938, 1939, and again in 1941 and its acreage has since decreased in the United States giving way to Rival and Pilot in the leaf-rust-affected sections. Thatcher replaced Marquis as a standard of comparison in 1939 and as it is still the most widely grown hard red spring variety it is here used as the standard of comparison for the different milling and baking properties.

These tests show Thatcher to average about medium in test weight being exceeded by a number of the commercially acceptable varieties. It has shown excellent milling qualities producing a high percentage of flour and somewhat better than would be expected from its test weight. The protein content is medium to high and the flour ash about average as compared with the flour ash from a number of other commercially grown varieties. The quality of the protein is strong. Thatcher has excellent baking qualities in experimental baking tests and is preferred by the grain trade for a strong type bakers' flour.

The dough characteristics of the Thatcher flour frequently tend to be "bucky" and is not as soft and pliable as the dough made from Marquis. Thatcher required a medium to long dough mixing time and medium amounts of oxidizing agents for optimum bread. The grain of Thatcher is medium hard according to the pearling index values. It ranks high in loaf volume of bread, has good grain-texture, satisfactory but only medium crumb color and a reasonably high water absorption. The 1946 correlation

coefficient for flour protein-loaf volume was medium (r=.8593) and the slope of the regression line (b=45.8cc). In table 13 are summarized the data from 1 to 9 years tests, giving the relative rank of 15 other wheats in percentage of Thatcher, for the principal milling and baking properties.

## PILOT

Pilot has been a uniform variety in plot experiments since 1936 and commercially grown since 1939. It has shown excellent milling and baking qualities in experimental baking tests and is approved by the grain trade for a strong type flour. Pilot is resistant to both stem and leaf rust, to mildew, bunt and some of the footrots. Pilot with $1\frac{1}{4}$ million acres in 1944 has since continued to increase in the western section of the spring wheat area.

It has been the highest yielding of the uniform varieties during the past 9 years; ranking first for the region in five of the years. It ranked fourth in quality in the Eastern composite and second in the Western composite during the four year period 1942 to 1945 inclusive. The weighted average of 129 comparable samples for nine years shows Pilot exceeds Thatcher with respect to test weight, optimum loaf volume, crumb color and grain-texture of bread. Pilot has made bread, during the last nine seasons, that has averaged considerable better than Thatcher in crumb color and except for two years much better than Thatcher in grain-texture.

It has been uniformly low in flour ash content and exceeded many of the uniform varieties in this respect. The quality of the protein of Pilot is good. Pilot averages lower in wheat protein content than Thatcher, but is equal to Thatcher in optimum loaf volume of bread for the average of nine years tests. Pilot has a short dough mixing time. It averages slightly lower than Thatcher for the other properties. In supplemental baking tests Pilot does not usually respond to increasing amounts of bromate and is easily injured by long fermentation. The dough properties of Pilot are elastic and pliable as contrasted with some varieties which produce "bucky" doughs.

The 1946 correlation coefficient for flour protein-loaf volume was medium (r=.8543) and the slope of the regression line ($b_1$) equals 46.4cc.

## RIVAL

Rival was made a uniform variety in 1938 and together with Pilot was distributed for commercial growing in 1939. By 1944 they had increased to six million acres, with Rival exceeding Pilot about 3 to 1. Rival has shown good milling and baking qualities in experimental baking tests and is considered satisfactory by the grain trade. It has a somewhat higher pearling index value suggesting that the grain is slightly softer than the grain from Thatcher. Both Pilot and Rival are awned wheats and do not have as strong straw as desired for the heavier soils in the eastern section. Among the uniform varieties Rival has yielded less than Pilot but more than Thatcher during the past nine years for the

region, and has yielded much better in the eastern than in the western sections. The weighted average of 97 comparable samples for nine years show Rival to exceed Thatcher with respect to test weight, flour yield, water absorption, crumb color, and grain texture. It is one of the better varieties in water absorption being exceeded only by Cadet and N1764 of 16 varieties compared. Rival has a slightly longer dough mixing time and requires slightly higher amounts of oxidizing agents than Thatcher for optimum bread. Rival is among one of the varieties high in flour ash. It averages higher than Thatcher but is lower than N.N. 1764, Cadet and Newthatch in this respect. It has been outstanding as to yield of flour ranking better than most of the varieties and strains grown over a period of years. Of 16 wheats shown in table 13, it ranks 11th in optimum loaf volume and 4th for the average of seven principal properties. The correlation coefficient for flour protein-loaf volume was high (r=.8954) and the slope of the regression line ($b_1$) equals 64.3, and was steeper than that of any of the wheats with which it was compared. This is the third season that Rival has outranked the other varieties in this respect.

## CADET

Cadet has been a uniform variety for the region for the five years 1942 to 1946. It is the result of a Merit x Thatcher cross and was increased in 1944 and distributed for commercial growing in 1945. Cadet is a midseason, awnleted wheat resistant to both stem and leaf rusts. It has been a high yielding wheat for the region but appears best adapted to the northern part. During a 7-year period 92 comparable milling and baking tests show it to exceed Thatcher with respect to crude protein content of wheat, water absorption, loaf volume for the optimum bake, crumb color, and grain texture. It has been outstanding in crumb color and grain-texture ranking among the better varieties and strains grown over a period of years. Cadet mills satisfactorily and is similar to Thatcher in hardness, according to the pearling index values. It has about the same dough mixing time and requires slightly higher amounts of oxidizing agents than Thatcher for optimum bread. Supplemental baking tests show that it responds sharply to increasing amounts of bromate and generally has greater tolerance to long periods of mixing and fermentation than most varieties. It has ranked high by the malt-phosphate-bromate bake used by the North Dakota, and Canadian laboratories. Commercial milling and baking tests for the last four years rank it high in quality. It is approximately equal to Thatcher in test weight and flour yield, has a higher ash in the flour a much greater water absorption. Among the 16 wheats, (table 13) it ranks fifth in crude protein of wheat, first in water absorption, sixth in loaf volume by the optimum bake, fourth in crumb color, third in grain texture, and second for the average of seven principal properties. The 1946 correlation coefficient for flour protein-loaf volume was medium (r-.8547) and the slope of the regression line ($b_1$) equals 50.1.

## MIDA

Mida was first made a uniform variety for the region in 1944 when it was distributed for commercial growing by the North Dakota Agricultural Experiment Station. It has been in plot experiments at the North Dakota and Minnesota stations for seven years. It was the highest yielding wheat for the region during the years tested but ranked fourth in 1946 of the uniform varieties. It is an awned, strong strawed wheat, resistant to both stem and leaf rusts and to bunt. Mida mills fair to good producing a high yield of flour. The grain is slightly softer than that from Thatcher according to the pearling index values and the milling tests. During eight years 88 milling and baking tests show that it exceeds Thatcher with respect to test weight, flour yield, water absorption, crumb color, and grain texture and has a lower wheat protein and ash content of the flour. In loaf volume Mida ranked lower than Thatcher by the No. 6, average, and optimum baking results. Mida has a slightly shorter dough mixing time and requires about the same amount of oxidizing agents as Thatcher for optimum bread. It ranked 15th in loaf volume according to the optimum bake, first in crumb color, and fourth in grain testure (same as Pilot) among 16 wheats. It averaged first in test weight per bushel, fifth in flour yield, and third for the summary of seven principal properties. The correlation coefficient flour protein-loaf volume (r) was .8267 and the slope of the regression line ($b_1$) 46.9.

## REGENT

Regent has been a uniform variety since 1942. It was developed and distributed by the Canadian Department of Agriculture in 1939 and has been grown commercially in the United States since 1940. It is recommended for growing on the heavier soils of the Red River Valley of Minnesota and North Dakota. In other areas, however, it has been damaged by heat and scab and has not been a high yielding wheat. It ranked fifth in 1945 and lowest or seventh in 1946 of the seven uniform varieties for the Eastern stations. It has shown excellent milling and baking qualities in experimental tests and has been approved by the commercial grain trade. Eighty comparable tests with Thatcher covering nine years show it to exceed Thatcher with respect to test weight, crude protein of wheat, flour yield, water absorption and loaf volume for the optimum bake, but lower in other properties. It is higher in ash of flour than Thatcher. The grain of Regent is found to be somewhat softer than that of Thatcher according to the pearling index values. Regent has about the same dough mixing time but requires considerably higher amounts of oxidizing agents than Thatcher for optimum bread. Regent has been particularly high in protein exceeding many of the wheats with which it has been comparably grown. The better loaf volume obtained from Regent indicates that the quality of the protein also is good. Regent averages eighth in the summary of seven principal properties. The correlation coefficient for flour protein-loaf volume was high (r=.8932) and the slope of the regression line ($b_1$) equals 56.6.

## NEWTHATCH

Newthatch is a composite of several Hope x Thatcher$^3$ backcross strains, one of which was a uniform variety for the eastern section in 1942. In 1943 Newthatch replaced the single line as a uniform variety for the eastern section and was made a uniform variety for the region in 1944. The variety was distributed to seed growers by the Minnesota Agricultural Experiment Station in 1944. It has been one of the better yielding wheats in the Minnesota plots averaging over a period of years the same as Rival but both yielding slightly lower than Vida. Newthatch has not been high for the region, exceeding only Thatcher among the five uniform varieties. By using yields and milling and baking data for the single lines included in the composite data are available for a seven year period. During this period 84 comparable milling and baking tests Newthatch has exceeded Thatcher with respect to crude protein of wheat, flour yield, water absorption, and loaf volume, (average and optimum) and grain texture. It was high in ash content, ranking third in comparison with 16 wheats. It has one outstanding advantage in being highest in protein content of the wheats compared. It has a slightly lower test weight than Thatcher but has yielded slightly more flour than Thatcher during each of the seven years compared. Newthatch has shown good milling quality in our experimental tests and is also considered satisfactory by the grain trade. The grain of Newthatch is slightly softer than Thatcher according to the pearling index values. In loaf volume, Newthatch ranks higher than Thatcher by the optimum bake. Newthatch has about the same dough mixing time, but requires slightly more bromate than Thatcher for optimum bread. It ranks sixth for the average of seven principal properties. The 1946 correlation coefficient for flour protein-loaf volume was not high ($r = .8101$) and the slope of the regression line ($b_1$) equals 44.4. It had the lowest loaf volume figured on a 13.0 percent protein content basis of the 16 wheats compared in 1946.

## HENRY

Henry is the highest yielding wheat in the uniform regional nursery for the three year period 1942 to 1944 and was increased and distributed by the Wisconsin Agricultural Experiment Station in 1944. It has also been a high-yielding wheat in Wisconsin experiments and has been tested at Minnesota, North Dakota, and South Dakota stations with favorable yield results. It was the highest yielding variety of the 16 wheats compared in 1946 and considerably exceeds Thatcher in this respect. During five years 30 milling and baking tests show that it exceeds Thatcher with respect to test weight, flour yield, and has one of the lowest ash content of the 16 wheats. Although not the highest in test weight, it yields more flour than any of the wheats with which it was compared. Henry has good milling characteristics. It has the highest pearling index value of the wheats compared indicative of a soft textured grain. The flour is soft and does not have the granular characteristics of hard wheats. It is one of the lowest in protein of the 16 wheats compared. The quality of the protein is very good, producing bread that has an optimum loaf volume nearly as good as some of the much higher protein varieties. It ranks lower than Thatcher in water absorption, and loaf volume by the optimum bake. It had a shorter mixing time and required much larger amounts of bromate than Thatcher for optimum bread. Henry is easily injured by long mixing but appears to have good fermentation tolerance. The dough characteristics are

somewhat softer than found in most of the hard spring wheats. It ranks lowest in crumb color, protein content, grain-texture and the average of seven principal properties of the 16 wheats compared. Henry had the second highest loaf volume figured on a 13.0 percent protein basis, being exceeded only by Rescue of the wheats compared. The correlation coefficient (r=.8158) between flour protein and loaf volume was low. The slope of the regression line ($b_1$) equals 54.2 and was among the highest.

## S.D. 2280

S.D. 2280 is a beardless selection from a Rival x Thatcher cross, developed at the South Dakota Agricultural Experiment Station. It was tested in the Uniform Regional Nursery for the three years, 1942 to 1944. It has been in plot experiments at Brookings for a six year period and for a single year (1946) at Newell, S. D. and two North Dakota stations. S. D. 2280 is a stiff strawed, early strain which has yielded well in South Dakota experiments. During five years 17 milling and baking tests show that S. D. 2280 exceeds Thatcher with respect to test weight per bushel, protein of wheat, yield of flour, water absorption, loaf volume of optimum bake, crumb color, and grain texture. It ranks lower than Thatcher in flour ash and is one of the better varieties in this respect. It has produced bread having especially good grain texture. S. D. 2280 has averaged high in protein of the 16 varieties compared. It has one of the highest pearling index values of the wheats compared indicative of a soft textured grain. S.D. 2280 has good milling characteristics. The dough mixing time is slightly longer than required for Thatcher. It does not respond to increasing amounts of bromate, requiring approximately one third the amount needed for Thatcher for optimum results. These few tests show that it has made exceptionally good grain-texture and has ranked highest in this and last years tests among the wheats compared. It ranks third in wheat protein, and flour yield fifth in loaf volume of optimum bake and first in the summary of seven principal properties. S. D. 2280 has proved to be of high quality and is one of the more promising strains tested during the last few years. No correlation coefficient or regression lines were calculated because of the small number of samples tested.

## N. NO. 1556

N. No. 1556 is an early bearded selection from a Ceres x Hope-Turkey-Florence cross developed at the Dickinson Substation, Dickinson, North Dakota. It was included in the Uniform Regional Nursery for the three years 1943 to 1945 where it was the earliest variety in the experiment for three consecutive years. It has been in plot experiments at Dickinson for five years and at other North Dakota stations and at some of the more southern stations for shorter periods. Because of its earliness it has yielded best at the more southern stations, particularly in Nebraska. During the four years (1943 to 1945) 17 milling and baking tests show that N. No. 1556 exceeds Thatcher with respect to test weight, protein of wheat, water absorption of flour, and crumb color of bread,

It is lower than Thatcher with respect to flour ash, yield of flour and loaf volume of bread by the optimum method. N. No. 1556 has good milling characteristics. It has about the same pearling index value as Thatcher indicating that the grain of both are alike in hardness. N. No. 1556 averaged slightly shorter than Thatcher in dough mixing time. It responds well to increasing amounts of bromate requiring for optimum results about twice the amount needed for Thatcher. It ranks seventh among 16 varieties for an average of seven principal properties. No correlation coefficient or regression lines were calculated, because of the small number of samples tested.

## N. NO. 1764

N. No. 1764 is Merit x Pilot (C.I. 12315) and has been one of the highest yielding wheats in the Uniform Regional Nurseries for the three years 1943 to 1945. It was advanced to plot experiments at most stations because of its good showing in uniform nursery trials. It is an early bearded wheat with good strength of straw. It also is resistant to stem and leaf rust, bunt, mildew, and scab. During the last four years 46 comparable milling and baking tests show it exceeds Thatcher with respect to test weight, water absorption, crumb color and grain texture. It has the highest ash content of flour among the varieties compared and the flour yield is relatively low, ranking 15th. It averages lower than Thatcher in wheat protein and loaf volume by the optimum bake. The grain of N. No. 1764 has a much lower pearling index value than the other wheats to which it is compared indicating that it is harder in texture than most of the commercially acceptable wheats and requires more water in tempering. With ordinary tempering it mills with difficulty requiring more reductions than the standard wheats and has therefore been objected to by the trade. It appears to be outstanding on the basis of four years results in water absorption of flour ranking first among 16 varieties. N. No. 1764 has about the same dough mixing time but requires only half the amounts of oxidizing agents than Thatcher for optimum bread. It ranks tenth among 16 varieties for the average of seven principal properties. It has been discontinued in plot experiments at some stations because of the reported unfavorable milling characteristics. The correlation coefficient (r=.8859) for flour protein-loaf volume was high and the slope of the line ($b_1$=50.9cc) was good.

## N. No. 1753

N. No. 1753 is Regent x Pilot (C. I. 12317). It was the highest quality wheat in the Uniform Regional Nursery for the three years 1943 to 1945 and was advanced to plot experiments at several stations. It has yielded about the same as Thatcher, is awnless, and has good straw and resistance to stem and leaf rust, bunt and mildew. It also has an attractive smooth kernel of heavy test weight. In 17 comparable quality tests with Thatcher (for four years) N. No. 1753 is equal to or exceeds Thatcher in all properties except flour yield and wheat protein and ranks first in optimum loaf volume among 16 wheats discussed. It has a slightly lower flour ash than Thatcher. N. No. 1753 has a lower pearling index value of the grain suggesting that it is slightly harder than Thatcher. Some samples of N. No. 1753 handle satisfactory

in the mill whereas other samples have been found more vitreous in character and require more tempering or more reductions to reduce the middlings to flour. It has one of the lowest flour yields of the 16 wheats compared. It is considered one of the outstanding strains from a baking standpoint. N. No. 1753 has about the same dough mixing time and requires about the same amount of oxidizing agents as Thatcher for optimum bread. It ranks ninth in the summary of seven principal properties. No correlation coefficient or regression lines were calculated because of the small number of samples tested.

## N. No. 1756

N. No. 1756 is Pilot x Mida (C. I. 12303) and was the highest yielding wheat in the Uniform Regional Nursery for the three years, 1943 to 1945. It has been advanced to plot tests at a large number of stations because of high yield and heavy test weight kernels. In the plot experiments it has also been high yielding, exceeding all of the uniform varieties. It is bearded with good straw, does not shatter bleach or sprout and is resistant to the rusts and smuts. During the last four years 36 comparable milling and baking tests show it exceeds Thatcher in test weight, flour yield, crumb color, and grain texture. It is outstanding in crumb color ranking first and in test weight ranking second among 16 wheats. It also has the lowest flour ash of the 16 varieties compared. N. No. 1756 has good milling characteristics. It has a slightly higher pearling index value suggesting that the grain of N. No. 1756 is slightly softer than that of Thatcher. It averages much lower in protein content and loaf volume by the optimum bake than Thatcher. It ranks next to lowest in protein content and lowest in optimum loaf volume among the 16 wheats compared. It yields a relatively low percentage of flour in relation to its high test weight and also when considered in relation with the test weights of the commercially accepted wheats. It had a slightly shorter dough mixing time but required about the same amount of oxidizing agents as Thatcher for optimum bread. The correlation coefficient (r=.8899) for flour protein-loaf volume was high and the slope of the regression line ($b_1$) equals 47.8 is intermediate.

## RESCUE

Rescue is a sawfly resistant variety developed at the Swift Current Saskatchewan, Canada station. Because of sawfly damage in Montana it has been increased rapidly for growing there. Outside of the sawfly area it is a relatively low yielding wheat, susceptible to leaf rust, drought, mildew and has weak straw. During the two years (1945 and 1946) twelve milling and baking tests show that Rescue exceeds Thatcher with respect to test weight and loaf volume of bread by the optimum bake. It averaged lower than Thatcher for absorption and all the other properties, ranking lowest among the 16 wheats compared in wheat protein and crumb color. The loaf volume of the bread was high for the low percent of protein found in Rescue. This suggests that the quality of the protein in Rescue is very good. It handles satisfactorily in the mill producing a flour similar to Thatcher in granulation.

It is one of the better varieties in loaf volume (optimum bake) ranking third among 16 wheats. Rescue had the highest loaf volume figured on a 13.0 percent protein basis among the varieties compared. Rescue had about the same dough mixing time but required about one third less amounts of oxidizing agents for optimum bread. It ranks 15th in the summary of seven principal properties. The 1946 correlation coefficient for flour protein-loaf volume was r=.8286 and the slope of the regression line ($b_1$) equals 38.5.

## N. NO. 1831

N. No. 1831 is Vida x Cadet (C.I. 12362). It has been in the Uniform Regional Nursery for two years 1945 and 1946, ranking fourth for yield in 1945 and first in 1946. It had the highest average optimum loaf volume for the eastern and western composites in 1945, but with its high yield ranked lower for volume in 1946. Because of the high yield and quality it was grown in plots on three stations in 1946. During the two years (1945 and 1946) nine milling and baking tests show N. No. 1831 to exceed Thatcher in test weight, flour yield, water absorption, loaf volume of optimum bake and crumb color. It averaged much lower in wheat protein but only slightly lower in grain-texture of bread than Thatcher. It is one of the lowest in flour ash ranking 15th of the 16 wheats compared. N. No. 1831 has good milling characteristics and produced a granular flour similar in this respect to the flour from Thatcher. It averaged about the same as Thatcher in dough mixing time. It required about twice the amount of oxidizing agents as Thatcher for optimum bread. N. No. 1831 ranked 11th in the summary of seven principal properties. No correlation coefficient or regression lines were calculated because of the small number of samples tested.

## REDMAN

Redman, R.L. 1834.1 was developed from a Regent x Canus cross at the Dominion Laboratory of Cereal Breeding, Winnipeg, Manitoba, Canada. It was distributed to Canadian wheat growers in 1945 and in the United States in 1946. It was first included in the Uniform Regional Nursery in 1946 where it ranked 23 for yield among the 26 wheats. The average of nine comparable samples for one year shows Redman exceeds Thatcher with respect to flour yield, water absorption of flour, loaf volume of optimum bake, and crumb color. It averages lower than Thatcher in test weight and grain texture of bread but is equal to Thatcher in flour ash and wheat protein content. It is outstanding in crumb color ranking second of the 16 wheats compared. It has a higher pearling index value, suggesting that the grain is slightly softer than that of Thatcher. Redman has good milling characteristics. It has about the same dough mixing time but needs a larger amount of oxidizing agents than Thatcher for optimum bread. It ranks fifth in the summary of seven principal properties. The correlation coefficient flour protein-loaf volume was high (r=.9112) and the slope of the regression line low ($b_1$) equals 37.8.